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Medical Topography of New-Orleans; with an Account of the principal Diseases that affected the Fleet and Army on the late Expedition against that City. Communicated by a NAVAL SURGEON.

"Ceterum antequam destinata componam, repetendum videtur qualis status urbis, quæ mens exercituum, quis habitus provinciarum; quid validum, quid ægrum fuerit; ut non modo casus eventusque rerum, qui plerumque fortuiti sunt, sed ratio etiam causæque noscantur."—TACIT. *histor.*

[From the Edinburgh Medical and Surgical Journal, for April, 1816.]

EVERY lover of medical literature, and of medicine as an experimental science, must deeply regret, that, though the expeditions undertaken by Great Britain, within the last hundred years, have been both frequent and formidable, there has been such a poverty of professional communications, that a good medical history of the greater part of them is now, and ever must be, a *desideratum*. While the policy and execution of such armaments are discussed in hundreds of newspapers, and give birth to clamorous pamphlets without number; medical facts and observations, which, instead of a shifting and transitory interest, may be of permanent importance to

mankind, are allowed to float down the silent current of oblivion, till they are lost for ever. It is painful to reflect how much this supineness of professional men has cost our art, and how rich a tract, fertile with knowledge and improvements, has thus been given up, without resistance, to the inundations of the river *Lethe;* whose waters (in this instance it may be said without epigrammatic quaintness) have preserved straws and trifles, while things of specific and sterling weight have sunk to the bottom without a hope of recovery.

In the late expedition against New-Orleans, what from the sword and from disease, there was such a loss of human life, as must cause the mere politician regret, and the philanthropist affliction. Such being the case, it will not, I hope, be considered as presumption in me, to attempt some account of the complaints that occurred; an attempt which, however feeble, may in some degree compensate for the want of a better. I could, indeed, have wished that some one of greater talents, and with better means of official information than myself, had executed this undertaking, and would now willingly lay aside my pen in expectation of such an event, did I not recollect that, by every individual's thus shuffling off the task of description from himself, in the vague hope that it may be performed by another, that very detriment to medical science has arisen, of which I have just complained.

New-Orleans is situated in 30 degrees of north latitude, and 90 of longitude west from London. It stands on the left bank of the Mississippi, about 100 miles from its mouth, and may justly be regarded as the Capital of this district of the New World, from its commerce, its opulence, and its population. It is the great emporium into which the scattered inhabitants of the upper country, and the surrounding desert, pour their cotton and their skins, receiving in return many of the necessaries of life, and some of the luxuries of refinement.

The river Mississippi forms a most august feature in the physiognomy of this country. While the majestic grandeur of its stream, and its *unexampled* length of course, excite the admiration of the naturalist, and its subserviency to the purposes of commerce claims the attention of the merchant, it is

no less interesting to the medical philosopher, from the direct and conspicuous influence which the distribution of its waters has upon the soil and health of the country around its mouth. This magnificent river has its source in the remote and almost unknown regions of the American continent. Slender in its origin, the infant flood is interrupted by mountains, and broken by cataracts, until it receives the proudly independent (rather than tributary) streams of the Missouri, the Illinois, and the Ohio, when it rushes irresistibly forward to the ocean, with a current both broad and deep. Pursuing its course with innumerable sinuosities, through fertile meadows, over whose vast extent the tired eye cannot stretch,—through sequestered regions where nature has no one to witness her awful mysteries, and through the gloom of forests coeval with the creation, it at last, after a course of *three thousand miles*, pours, by several mouths, the mass of its weary waters into the gulf of Mexico.

The country around New-Orleans is a perfect plain, frequently intersected by the outlets of the river, and not unfrequently, during winter and spring, watered by its inundations. Indeed, the city itself is built upon what may be called a *Delta*, formed by this *Nile* of the Western World. In a country of this description, it will easily be conceived, that marshes are very numerous and extensive; in fact, the whole country, especially in winter, is a continued marsh, with merely solid patches (very fertile indeed) here and there. The few roads, and the site of the different forts, are generally *made-ground.*

Even the ground on which the city stands, bears evident marks of comparatively recent formation; for, on digging a few feet under the surface, abundance of water, soft mud, and trunks of trees are met with. These last have no doubt been flooded down, and stranded by the current, where receiving hourly reinforcements of vegetable rubbish, the whole has been bound into one immoveable mass by the viscid mud of the river.

The climate, too, of New-Orleans, must not be overlooked, as its peculiarity, co-operating with the above-mentioned distribution of the Mississippi and the condition of the soil, is

the real and only cause of those formidable diseases to which this city and its vicinity are subject. It is one of the anomalies of the New World, not yet very satisfactorily accounted for, that the intensity of the heat in summer, and of the cold in winter, is much greater than in the Old World, on the same parallels of latitude. This difference is very obvious all along the eastern shores of the American continent, but no where is it so striking as at New-Orleans. From the end of November till the end of March, the weather is generally cold and rainy, with frequent hard frosts. At those times the thermometer ranges from 20° to 40° in the shade; and there are instances, I am told, even in so low a latitude as 29° north, where, in the night, it is only a few degrees above Zero. On the contrary, during summer this climate has all the characteristics of the torrid zone; the thermometer stands at 87° or 90° in the shade. At New-Orleans, especially, the weather is close and suffocating, from its distance from the sea, and, consequently, the entire absence of that inestimable luxury of a tropical climate, the *sea-breeze;* from the air being loaded with watery vapours; and from the smell of the mud of the river and swamps, which is often, even in winter, very sensibly offensive.

The description here given of the climate and soil of New-Orleans will apply, almost without alteration, to the contiguous district of the Floridas. In the former, indeed, there are traces of human care and refinement; but, in the latter, Nature still pours forth her gifts in solitary and unprofitable exuberance. Never did I see a shore more inauspicious and uninviting. The whole country is a dreary flat, indented with stagnant creeks, salt-water lagoons, and muddy rivers, whose waters are concealed by the darkness of endless woods, that approach to the very brink of the sea, as if envious of its dominion. Here there is no variety,—no eminence to relieve the eye while wandering over the insipid level of dingy green,—not a single appeal to human feelings,—not one object to call forth those mixed undefined associations of interesting simplicity, domestic content, happy industry, and cheerful civilization, which constitute the charm of the rural landscape in

Europe. On the contrary, the whole scene suggests vague impressions of solitary terror, and savage wildness, and presses home upon the heart the chilling ideas of dereliction and desolation.*

The local peculiarities in the climate and soil of New-Orleans give rise, during winter, to epidemic dysentery, and, in summer, to marsh fevers of a very rapid and dangerous form, from which the inhabitants, but particularly strangers, suffer most severely. The occurrence of such complaints, some readers, from the above detail, will be prepared to expect as a *necessary* consequence. Lest others, however, should be sceptical, it shall be my business, by and bye, to make this preliminary picture of the medical topography of the country subservient to discussions of higher interest, and to prove, by facts, the reasonableness of opinions.

"Hoc opus exiguum *vario sermone* levemus:
Perque vices aliquid, quod tempora longa videri
Non sinat, in medium vacuas referamus ad aures."—Ovid. *Metam.*

About the middle of November 1814, the expeditionary force destined to act against New-Orleans, arrived at Jamaica, under the command of Vice-Admiral the Honourable Sir Alexander Cochrane. That island had been pitched upon as the pivot of extensive military operations against the southern shores of the United States; and the whole fleet of ships of war and transports having rendezvoused there, took their departure from Negril Bay, at the west end of the island, about the end of November, full of health and hope.

Before the middle of December, the fleet arrived on the coast of Florida, and took steps for disembarking the troops without delay,—a measure against which Nature seemed to have opposed ample and almost unsurmountable obstacles. It

* I am sorry that my account of this district is so entirely opposite to the published opinions of the venerable traveller, M. Chateaubriand. In hyperbolical raptures, and in the very pith of sentimentality, has this amiable enthusiast declaimed about "the oaks of Florida,"—"the spirit of the desert,"—"the pleasures of an Indian camp,"—and all the delightful et cæteras of a savage life!!——'Tis indeed passing strange. But, "De Gustibus," &c.

would have been desirable for the fleet to have proceeded up the main channel of the Mississippi, by which an approach to the town would have been secured; but, besides lesser shoals, its mouth was secured by a bar, having only 10 feet water, over which none of the frigates, and very few of the transports, could pass, however lightened. Besides, at that season of the year, the river being swollen with rains, the current was running strong down. Its tortuous course, too, would have required a great variety of winds to make good the passage of an hundred miles up; and its principal *detours* and elbows were defended by Port Placquemaine, and other batteries of great strength.

This point of approach being out of the question, the fleet, passing betwixt two sandy uninhabited isles, in a very intricate navigation, made its way into the *gorge* of one of those broad salt-water lakes (considerably to the left of the river's mouth) that runs a length of way into the country, and embraces one of the minor outlets of the Mississippi. The water, however, was so uniformly shallow, that the frigates and transports grounded in the mud, at the distance of 70 miles from the nearest point of the Delta on which New-Orleans stands; and, consequently, all disembarkation was, of necessity, conducted at this disadvantageous distance. Moreover, the passage of this lake was obstructed by five large American smacks or gun-vessels, mounting several heavy guns each, and admirably adapted, from their build, for operating in those shallow waters.

The latter vexatious obstacle, however, was soon conquered by our sailors, who showed, on this occasion, all that "*æs triplex*,"—that careless characteristic valour for which they are so illustrious. The boats of the fleet, manned and armed, were sent away, and, after a tiresome row of 36 hours, succeeded in penning the enemy up in a creek, where they attacked them against the superior odds of their position and their force; and, after a furious engagement, captured every one of them. This achievement was decidedly gallant, and would have stood amidst the most brilliant feats of naval warfare, had not the subsequent failure of the main object of the expedition thrown a bleak shade over its lustre.

The wounded on this occasion belonging to the different ships were not very numerous. The only thing I find worthy of commemoration was the rather unusual number of instances of tetanus supervening to the wounds, although the weather was dry, frosty, and apparently favourable to their healing. One case of marked tetanus, I understand, was successfully treated on the stimulating plan; but my information is not sufficiently precise to admit of particulars.

The landing of the troops was conducted by the boats of the ships of war and transports; but the distance was so great, and the weather so tempestuous, that it was the latter end of December ere the whole army was disembarked before New-Orleans. Even when this important object was achieved, there was little or no remission of toil to the sailors, for the army still required to be supplied with warlike stores, and fed from the fleet, at a distance of 70 miles.

About the beginning of January, 1815, bowel-complaints, which had previously appeared amongst the boats' crews and the fatigue-parties of the army, began to be very rife. They varied in degree of severity, from the milder symptoms of dysentery to its most aggravated forms. I may enumerate, in a few words, the symptoms of this disease. The patients, for the most part, complained of severe tormina, tenesmus, scanty bloody dejections, want of appetite and strength, *pains all over them*, and a disposition to vomit on taking either food or drink. The tongue was white or yellow; the eye languid; the pulse above 100, small, and easily compressed; the skin often dry, or covered with clammy sweat, but always considerably increased in temperature.

The causes were, generally speaking, obvious enough. The men had been rowing all day, and sleeping all night, in the open boats. They had incautiously drank the brackish water of the lakes, and had sometimes been obliged to eat their beef and pork raw, when, on an emergency, they were deprived of an opportunity of cooking it. They were often drenched with rain or with spray, without being able to put on dry clothes. Added to all this, the weather was extremely cold, particularly in the night, the thermometer before sun-rise being often

as low as 25 or 26 degrees, rising no higher during the day than 30 or 38 degrees, and seldom above 50°.*

The locality of the general rendezvous for the boats was very bad (though the best that can be found), being a miry place, covered with reeds, and abounding in miasmal exhalations.

The encampment of the army, too, was on a swampy spot on the left bank of the Mississippi, about six miles below New-Orleans. Indeed, the whole vicinity is a swamp, which, after the rains, so frequent at that season of the year, became a perfect puddle. Having the Mississippi on their left, they drank its discoloured and polluted water, and were exposed to the effluvium of its slimy mud, as well as to the paludal exhalations of an impracticable wooden morass on their right. The huts also in which the troops were sheltered were far from being impervious either to rain or cold; so that, upon the whole, the army and navy, in point of privations, were much upon a par.

On the first appearance of dysentery, its treatment was commenced by a flannel roller bound tight round the abdomen, and ordering flannel clothing next the skin, if the patients had it not already. Saline cathartics, or oleum ricini, with a few grains of calomel, were repeatedly given, until the stools were increased in quantity, and more freely rendered. At the same time, plentiful dilution, with tepid gruel, warm tea, rice-water (seasoned with sugar and *a little* wine), decoctions of lintseed or of gum-arabic, I always considered of primary importance.

When the primæ viæ had been fully evacuated, an attempt was made to restore the natural secretions, and open the pores of the skin. Antimonial powder, with opium, was employed for this purpose, but more generally the pulvis ipecacuanhæ compositus, which certainly seemed to succeed best.

* These observations of the thermometer are repeated from my own inspection. On this occasion the cold was so intense, that several of the boats' crews were incapacitated for some days, by pain and numbness of the lower extremities. Many soldiers of the negro regiments had their feet frost-bitten, and lost their toes by the consequent gangrene and sphacelus. Some of them even died in the camp, or in the boats, from excessive cold.

Whenever tormina and straining returned worse than ordinary, a cathartic was given in the morning, followed by a large dose of opium, or an anodyne diaphoretic at night.

By these means, aided by perfect quietude, repose, and low diet, the pyrexia soon disappeared, and nothing remained but debility and irregularity of the bowels, which were to be removed by the mistur. cret. c. opio, the infus. quassiæ excels., or the mistur. cinchon., given thrice or four times a-day, and a gentle laxative once in three or four days.

Many of the earlier and milder cases yielded to this treatment, but those of a severer sort required measures less inert. In these malignant forms of the disease, I began by giving a strong saline or lubricating cathartic. Blood-letting also was practised when the patients were young and robust, or, indeed, whenever the force of the pulse and pyrexia seemed, on general principles, to justify it. I never saw cause to repent of this evacuation. Practised with prudence, it often moderated local pain of the abdomen, and did not perceptibly increase the subsequent debility. These preliminary steps being taken, I immediately commenced the use of *calomel*, and pushed on boldly to salivation, from the belief, which seems to be well founded, of an occult connection betwixt dysentery and a morbid condition of the liver.*

The doses I gave were regulated by the constitution of the patients, and the actual state of the symptoms; but one scruple night and morning was the most usual prescription, seldom less than ten grains thrice a-day. I have given a scruple night and morning so often, that I have long ceased to be at all anxious about hypercatharsis. It certainly seldom, in any case, increases the tormina and tenesmus, but generally lessens both very materially, and produces five or six large motions, voided with less straining, and less tinged with blood. I have in this

* A work has lately appeared, by Mr. Johnson, surgeon, Royal Navy, wherein this connection is earnestly maintained, and, I think, proved. Notwithstanding some assumed notions about the "Portal circle," rather hyperbolically extended, the work is really one of great ingenuity and utility. Perhaps its greatest fault is, the imposing air of novelty and exclusive improvement with which he promulgates his practice in dysentery,—a practice long known to his brethren in the navy who have served in tropical climates.

way given 16, 18, or 20 scruples of calomel in the course of half as many days, before the mouth became affected. When the gums were fairly sore, with some ptyalism, the calomel was omitted, the tormina and tenesmus disappeared as a matter of course, and the bowels gradually returned to their natural state. Some tonic or stomachic was prescribed during the days of convalescence; and, generally, as soon as the mouth was well the patients were fit for duty.

Calomel was often thus given alone and uncombined; but often I thought it preferable, on account of occasional symptoms, to conjoin with it two grains of opium, or to give at noon (in the interval betwixt the doses) twelve or fifteen grains of the Pulv. ipecac. compos. This was done to lessen the irritability of the bowels, and to support the cuticular discharge. Under such management, every case recovered where no *visceral obstructions* existed,* or where the coexistent disease of the liver was not irretrievable.

Opium is one of those remedies of doubtful utility in dysentery, which has been by some violently decried, and by others sparingly used, from its alleged tendency to check the natural secretions, especially that of the skin. Candour obliges me to say, that I have used it largely, and that I never noticed any of the unfavourable effects urged against it; but, on the contrary, can bear witness, with Dr. John Hunter, to its beneficial power. Given after purgatives, it can never be unsafe; and if it does no more, it procures a temporary truce from the disease. How important a cessation from suffering is in every illness, but more especially in so endless and harassing a complaint as dysentery, I need not say. Prejudices, probably illusory and theoretical, ought to give way to an advantage so solid.

Almost the whole body of the profession have concurred in praising injections in this disease. I of course defer to the

* This is a more frequent occurrence, even in our own climate, than, I believe, is generally expected; but, of those who have lived for any length of time within the tropics, it will be found, that *four-fifths* have one viscus or other in the abdomen, more or less altered by morbid action. This opinion is deduced from a very considerable number of dissections of such subjects.

experience of others, while I detail my own. Having found them almost uniformly hurtful, I entirely laid them aside. The irritation produced by introducing the pipe, more than counterbalances the soothing effects of the injection. Besides the unpalateableness of this species of remedy to the good old English habits of delicacy, I have always seen that, were the enema ever so bland, or ever so small in volume, it could not be retained beyond a very few minutes, and always occasioned more straining and tenesmus in the sequel. As a commodious substitute for injections, I have directed patients to insinuate into the anus a *small* crumb or two of opium, softened betwixt their fingers for the purpose; or have caused warm fomentations to be used to the parts, and bladders of hot water to be applied to the hypogastric region. These are wont to succeed so well, that the patients speak in strong terms of the relief afforded.

The advanced guard of the army was disembarked on the 24th of December, and took up a position on the *only* road to New-Orleans, there to wait the landing of the remainder. This body was fired upon, in the night, by an armed vessel from the river (which had dropped down with the current after dark), and by the American army on their right and front. With such unequal numbers, the conflict was obstinate, but very glorious to our troops, who put the enemy to the rout, and drove them "l'epee dans les reins," a considerable distance along the road. There is little doubt, but that for the profound darkness, and the small number of our troops yet landed, the Americans, in their confused flight, would have been followed into New-Orleans, and the town thus taken by a *coup-de-main.*

Instructed by this sharp and unexpected lesson, the enemy forthwith turned his attention to strengthen his commanding position, at a *narrow* part of the road, and every hour rendered it more formidable.

Meanwhile, our whole force had landed, but could not advance till batteries had been erected to destroy the armed ves-

sel, whose fire raked the left bank of the river, and flanked any forward movement of the troops. When this desirable object was accomplished, an attempt was made to cannonade the enemy's works, but it did not succeed.

At last the fatal morning of the 8th of January arrived. Before day-light, the whole of our army advanced in columns to storm the American lines;

> "Quis cladem illius noctis, quis funera fando
> Explicet? aut possit lachrymis æquare labores."—VIRGIL, *Æneid.*

The works were defended by a broad ditch filled with water, as also a palisade, and a wall mounted with numerous pieces of cannon. The enemy, apprised of our intended invasion, had drawn these lines quite across the only road to New-Orleans. They were absolutely inaccessible at their flanks, as their right touched the Mississippi, and their left rested on an impassable wood and morass. This was the spot which the laws of Nature, as well as the rules of art, had concurred to strengthen; this was the strait which the Americans would fain compare to the immortal pass of Thermopylæ.

The attempt to storm failed. In this instance "fortune did *not* favour the brave;" our columns were beat back at every point with a loss, I believe, of more than five hundred killed, and fully twelve hundred wounded!

The main object of the expedition having thus failed of success, the troops were once more collected on board the fleet, and proceeded off Mobile river, to attack the town of that name. Fort Bowyer, which defends the harbour's mouth, being quickly and regularly invested, was captured on the 11th of February; but the ulterior operations were suspended by the arrival from England of the news of the peace of Ghent. The troops were disembarked on a sandy uninhabited spot, called *Dauphin* island, there to await the ratification of the treaty, and the arrival of such supplies of provisions as would enable them to prosecute the voyage homeward.

It is worthy of remark, that, notwithstanding the almost unexampled fatigues and privations of all sorts to which the army and navy had been exposed while before New-Orleans,

sickness of any kind, up to the 8th of January, had made comparatively little progress amongst them. The bowel-complaints, though numerous, were for the most part easily removed; and no other disease of any consequence prevailed. It is a remarkable fact, in the medical history of fleets and armies, that, during the fatigues and sufferings of a hot campaign, or the active progress of warlike operations, the men are very little subject to illness of any sort; as if the elation of hope, and the other great passions with which they are agitated, had the virtue to steel the constitution against the most powerful causes of disease. This circumstance, no less curious than true, proudly proves the ætherial origin of our nature, and goes far to assert the omnipotence of mind over matter. No sooner, however, does a great failure, and the dejection it draws after it,—a cessation of operation, and a return to the "vita mollis," allow the spirit of enterprise to flag, than the previous fatigues and exposures begin to tell upon the constitution by their usual results—*disease.* Like a machine wound up beyond its pitch,—the excitement of accumulated motives once withdrawn,—the human frame rapidly runs down, and yields with a facility almost as unexpected as its former resistance. Hence, after a campaign, diseases of all sorts are prone to a type of debility and aggravation, and the proportion of deaths is unusually numerous.

Accordingly, in the instance before us, the pressure of ill success began to be severely felt after the failure of the 8th, and the consequent reimbarkation of the army. By this time unremitted fatigues, poor living, and that at short allowance, with the total want of fresh beef and succulent vegetables, not only altered for the worse the character of the bowel-complaints, and produced a fatal relapse in some recently cured, but also introduced scurvy, with its multifarious train of perplexing symptoms. Exposure to marsh miasmata, also, produced many cases of intermittent fever. By this time, too, the weather was getting warmer (the thermometer generally ranging from 60 to 70 degrees), accompanied with more sudden vicissitudes, and a greater proportion of rain.

Dysentery now put on that exasperated form in which it

has so often scourged our camps and fleets; and never shall I forget the terrible force of this invisible enemy. In all cases it was a very baffling untractable disease, but in those who had previously served long in warm climates, and whose livers were thereby affected, it was almost uniformly mortal. When the disease attacked such persons, it was a subject of melancholy but curious speculation to witness the headlong course of the disease, and how unavailing any species of treatment invariably proved. It knew neither pause nor hindrance, but like the fabled vulture of *Prometheus*, pursued its cruel task from day to day. Dissection always brought to light extensive visceral obstructions, particularly chronic inflammation, or abscess of the liver, with or without enlargement.

Nothing but experience can convey adequate ideas of the ungovernable nature of this disease, or of the insidious masked approaches of its attack. Days of an indisposition, apparently trivial, sometimes occurred ere the peculiar symptoms of dysentery showed themselves; at other times, pyrexia, high or slight,* and occasionally pain in the right side, obtuse or acute, followed by frequent copious dark green stools, (like *boiled spinage chopt*), slightly tinged with blood, were the form of the disease.

Griping was little complained of. There was merely a sense of weight in the hypogastric region, and a copious *flux* of green or dark-coloured sordes, voided without straining. The tongue was covered with a yellow fur, which, in the advanced stage of the disease, became thick, dark, and immoveable, as a slab of black marble. The pulse was sharp, but weak; frequent retching and hiccup attended; and a sensation, as if all the drink swallowed, hot or cold, ran speedily through the intestines. Oftener the complaint would make its attack with

* I may observe, that I never had the slightest reason to believe the disease itself, or its attendant pyrexia, to be at all contagious. I may also remark *here*, though I anticipate the course of the narrative, that in April and May, when the weather became hot, the character of the prevailing dysentery was rather exasperated by it; unlike the dysentery of cold climates, which is generally rendered milder, if not extinguished, by atmospheric heat.

the common introductory symptoms, and no pain in the right hypochondrium was felt throughout the disease, either on inspiration, or strong pressure beneath the ribs. Under whatever garb of disguise it made its appearance, disease of the liver (as I have before stated), and consequently a vitiated state of its secretions, were undoubtedly the primary cause of the mischief. Dissection of the fatal cases showed structural derangement, and generally suppuration of that viscus. I have often found two separate abscesses in the central part of its large lobe, containing in some instances a pint of pus, similar in colour and consistence to what is usually found in psoas abscesses.

On the villous coats of the colon and rectum, there were numerous excoriated points, with small superficial ulcers here and there, like the sequelæ of erythematous inflammation; but there were no morbid alterations sufficient to account for death; no ravages of gangrene, &c. like those related by Sir John Pringle and others, in their accounts of this malady.

In short, to give a condensed view of the whole matter, the phenomena of the cases that recovered, as well as the morbid appearances of those that died, impressed upon my mind a conviction, that the diseased condition of the liver was the soil from which dysentery drew its malignant growth, strength, and nurture. This was the "fons et origo mali;" by it the dysentery was excited, and only by *its* removal could it be removed. This double detriment—this *Janus-like* aspect of the disease, I rather think, is new to many of the profession, but I trust it will soon be widely known and acknowledged. I hope the time is not far distant, when, instead of viewing dysentery as an idiopathic disease, and tracing its seat to the colon and rectum, medical men will regard it merely as secondary to, and symptomatic of hepatic affection, and will seek its cause in a morbid condition of that important gland.* Whatever may be the *mode* of connection be-

* It seems to be one of the errors of modern medicine, to overlook in practice the liver and spleen, merely because the necessity of their functions is not so obvious and immediate as that of some other organs. That a gland so large and of such unexampled vascular structure as the liver, should have

tween hepatitis and dysentery, I have no doubt that, at least in tropical climates, they are connected like cause and effect. I am *unwilling* to offer any hypothesis on this subject, purely because I am *unable;* this I confess, for I shall never chime in with that tone of affected contempt for all theories, in which presumptuous dulness so often shelters its imbecility. Those who indulge this disgusting oft-repeated cant, ("crambe bis millies cocta,") ought to be reminded, that not merely in medicine, but in all other sciences, few brilliant discoveries have been made, except by those acute and industrious men that were shapening and toiling at some untractable theory. However much all their diligence might fall short of the results they themselves fondly expected, still so much digging and delving often turned up very valuable ore, and always left the soil in a fitter state for the future labourers in the great field of improvement.

To return to the subject under consideration, I can readily conceive, that, from disease of any gland, the fluid it secretes may acquire acrimonious properties, sufficient to injure the fabric of the passages through which it is destined to pass.

much occult influence in all diseases, might, from the mere reason of the thing, be supposed. Its secretions influence the state of the stomach, and are influenced in their turn by the passions of the mind: and many facts would lead us to believe that there is a hitherto undescribed sympathy betwixt *this* viscus and the *brain.* I am informed, from a gentleman who has practised long in India, that patients have been suddenly seized with amentia, rigors, delirium, and syncope, speedily followed by death; and that, on dissection, abscess of the liver was the only peroeptible cause of such symptoms.

The depressing passions I have seen to have a striking effect on the biliary secretion, and even to induce cholera; whereas anger, like intoxication, when habitually indulged, gives rise to chronic enlargement and obstruction of the liver. In short, the functions and sympathies of this gland, which were deservedly of so high account with the ancients, seem to be insufficiently studied by modern physicians.

Horace, in the following lines, instead of a popular or poetical tenet, has probably expressed a curious and unexpected pathological fact.

"———————— Væ, meum
Fervens *difficili bile tumet jecur.*
Tunc nec *mens* mihi, nec *color*
Certâ sede manet.——HORAT. *Carm.*

We generally observe in dyspeptic complaints, or after a period of constipation, when the bile, from *remora* in the bowels, becomes morbid in quantity or quality, either that a spontaneous diarrhœa comes on, or, after a brisk cathartic has been exhibited, that the dislodged bile excites a sensation in the rectum, as if *boiling lead* were voided. When the state of the liver is still more morbid, may not the bile acquire the property of exciting *flux*, and of excoriating and ulcerating the villous coat of the colon and rectum?

These speculations I present with the greatest diffidence; and certainly do not wish to amalgamate them with the *facts* above recorded, which I pledge myself to have observed diligently, and reported faithfully. The latter are Nature's work, and, *as such*, will be confirmed by future experience: the former are matter of conjecture and personal opinion, which may stand or fall at the reader's pleasure; for, as Cicero well observes, "Opinionum commenta delet dies, naturæ judicia confirmat."

Whether, therefore, the ratio symptomatum just given approach to nature's actual steps, I know not; but it is certain, that the practice which most readily removes the disease seems to countenance the above mode of reasoning. The *mercurial method* I have pushed to a great extent, and its results have been such as to give it a very decided preference, in my estimation. Calomel, that great specific in obstructions of the liver, given in large doses (generally one scruple twice a-day), combined with opium, to cause it to be retained in the system, corrects the condition of the liver, prompts healthy secretion, and resolves pyrexia; as soon as ptyalism takes place, the dysenteric symptoms disappear, and the appetite gradually returns. Upon the whole, my own experience, as well as that of some others that served in this fleet and army, warrants a far more certain expectation from this mode of treatment than from the alternation of purgatives with astringents, or any other heretofore in use.*

* I shall here mention a fact which may be regarded as the *experimentum crucis*, decisive of the rival merits of the two methods of treatment. The ship in which I am employed remained in the Gulf of Mexico after all the

Though mercury had, in this manner, such commanding influence over the disease, still experience here was not always uniform, for there were several vexatious instances where it failed. I do not speak of the fatal cases (for in them neither laxatives, astringents, fomentations, blisters, opiates, mercurial frictions on the abdomen, nor calomel pushed to salivation, ever were able to keep off the unhappy event), but expressly of those few instances where the patients, after being apparently cured, relapsed without any evident cause (I may observe, by the way, that relapses are more frequent, and more generally fatal, in this disease than in any other), or where ptyalism mitigated the symptoms somewhat, perhaps even suspended the disease entirely, until the mouth was well, and then it returned with much of its pristine violence. The disease thus ran into the chronic form, and harassed the patient for weeks, or even months, with the various symptoms arising from a weak irritable condition of the primæ viæ, irregular hepatic secretion, and imperfect formation of the chyme. The chief of these symptoms were, vomiting after meals, night-sweats, febricula, watching, pains in the lower

rest of our force had retired. From the large expenditure of calomel, I at last had none left, and there was not a grain to be procured. At this time I had several cases of dysentery, which, from necessity, I was obliged to treat, for several days, on the *old* plan, by neutral salts, or oleum ricini, alternated with anodyne sudorifics, mistur. cretac. rhubarb, diluents, &c. &c. One case was, indeed, of so bad a type, that I had made up my mind for its ending fatally. Luckily, however, our arrival at the Havannah enabled me to procure a supply of good calomel; and I immediately commenced with ten-grain doses thrice a-day. *Next morning* the patient was better; had passed a tolerable night; had less tormina and tenesmus, and a cleaner tongue. I increased the dose to one scruple night and morning, and thenceforth his improvement was perceptible from day to day. The pyrexia soon abated, and, in ten days, his dejections, from being green and fetid, had recovered the natural yellow colour, or nearly so. No complaint remained but a sore mouth. The patient is now living, and likely to live, a witness to the superior efficacy of this mode of treatment. The above is merely one of many instances where I have seen calomel work rapidly, and like a *charm*.

As a proof with how little apprehension calomel may be given to persons of all ages, I may state, that, to a boy of 14, *one hundred and fifty-two* grains were given, during the acute stage of a most dangerous attack of dysentery, before his mouth became fairly sore!! He fully recovered.

belly, occasional tenesmus, frequent costiveness, followed by spontaneous diarrhœa and discharges of blood, attended with frequent prolapsus ani and difficult micturition.

In conducting the cure, very delicate management was requisite; in fact the disease required rather to be led than driven. A regulated diet, and the use of flannel next the skin, were of the highest consequence. At the same time, the patient was put under a gentle and gradual course of calomel, taking two or three grains morning and evening, and rubbing in a portion of mercurial ointment on the belly and right side. Laxatives and astringents were employed occasionally, but, above all, the greatest use was made of opium, both internally and locally, *per anum*, and it really effected most conspicuous benefit. Sulphate of zinc I now and then tried, but from the nausea which it excited, even in three-grain pills, morning and evening, and from its apparent inefficacy in the disease, I should scarcely, in future, be tempted to give it farther trials. The tonic power of Peruvian bark was very useful both as an astringent to the bowels and as a restorative to the whole system. When the mouth was recovered from the first gentle mercurial course, if the complaint had not yielded, I did not hesitate to use calomel again in the same gradual manner, till the gums were slightly affected, and then gave tonics as before. This assiduous perseverance, and the patient attention which it implied, I am happy to say, were well rewarded. Many patients were thus recovered from a state, not hopeless indeed, but very precarious, and were re-established in firm health.

I have been thus minute on the subject of dysentery, seeing it was the principal disease by which we suffered. The practice above detailed was not merely my own, but was pursued, though perhaps with minute variations, by most of the medical officers of my acquaintance on this expedition.

I have before mentioned, that, besides dysentery, many cases of intermittent fever and scurvy occurred; in truth, the latter diathesis was often very conspicuous in the patients affected with dysentery. Of the intermittents I need not speak, as nothing remarkable took place in their symptoms, and they were all easily cured by the usual means. Of scurvy, however,

from the great number of the cases, and the fatality of some of them, it is necessary that I should give some account. Besides the customary symptoms of livid blotches, bleeding gums, a d a slow healing of the small cuts or scratches accidentally inflicted, phlegmonic inflammation and suppuration sometimes occurred spontaneously on the leg, followed, when the abscess burst or was opened, by sphacelation of the cellular substance. Often, too, trivial sores would change, in a night, and take on ulcerative action, with extensive sloughing of the integuments and muscles, and a most profuse ill-conditioned discharge. When the mere loss of parts was so considerable as to render it impossible to save the limb, and the resource of amputation was called for, the case did not often end well; for the stump, after doing apparently well, degenerated without any evident cause, and was seized with sloughing, a black thin fetid discharge, and a general melting away of the muscles, until they were insufficient to cover the bone. Hectic fever and exhaustion gave the patient his last release.

In this formidable complaint, which may be denominated "sloughing scorbutic ulcer," many remedies were employed, both internally and externally. The internal ones were lime-juice, bark-mixture, and mineral acid; but it would appear that the former, though adequate to correct a mere proclivity to scurvy, has little or no power in these more advanced and serious states of the disease. In fact, it was not to be so corrected; it was not merely vegetable acid, but esculent vegetables, fruits, refreshments, and repose, that were necessary. It was purely from the want of these that the people had suffered; for neither crowding, impure air, nor filth, had any existence in situations where this form of scurvy often appeared.

Equal parts of basilicon and oil of turpentine (melted and applied warm to the ulcer), mixtures of lime-juice, or rum and water, charcoal cataplasms, common poultices, bark decoctions, or bark in powder, were employed as outward applications to a sore; but though they kept it cleaner, they were often of no avail to arrest the sloughing process. A solution of *two drachms* of *alum*, in about a *quart* of water, was, upon the whole, an admirable local remedy, and seemed to possess

wonderful powers in stopping the ravages of sphacelus, and giving a healing tendency to spreading ulcers. For the knowledge of this application, which is not more simple than efficacious, I am indebted to the liberality of Mr. Boyd, surgeon of the Gorgon Hospital-ship, a gentleman of uncommon ability and experience in every department of the profession.*

The detail of this season of peril and pressure closes here. It commenced about the middle of January, and its painful duration was upwards of two months. During the last week of March and first week of April, the main part of the expedition finally left those shores; therefore the observations I am about to make on fever, apply less to the armament in general, than to the force (chiefly naval) that was obliged to remain in the gulf of Mexico for several weeks after the rest had proceeded home.

The frosts and cold rains which had lately prevailed on this coast were now at an end, and the weather rapidly mounted to the average standard of the torrid zone. During April and May, the thermometer was never below 80 degrees, and often indeed rose much higher. This greatly augmented temperature soon began to tell on the people, and gave rise to many cases of cholera and of ardent fever,—the latter entirely confined to those who had previously been serving on shore, or exposed much to the sun and night-dews while pulling in boats on the coast, or in the river of Apalachicola. Of the former disease, not one instance, so far as I know, proved fatal. Large doses of calomel, with opium, and plenty of mild diluents, constituted the whole of the treatment. In ardent fever, however, the success, though great, was by no means so uniform.

Of the treatment I come now to speak. Regarding this disease to be, to all *practical* intents and purposes, inflammatory, and the affection of the head to be primary and essential; which is evinced by headach, intolerantia lucis, and red eyes, occurring as the earliest symptoms (for the eye is here an index of the state of the brain, in the same manner as the tongue

* I trust Mr. B. will excuse this unauthorized citation of his name and authority.

is of the state of the stomach), I have never hesitated to push evacuations to the utmost. Bleeding from the arm or frontal branch of the temporal artery, was always my first step; and large and repeated bleeding during the early stage (the earlier the better) I consider the great palladium of the patient's safety. One cannot tell how many ounces ought to be taken; we ought to bleed to syncope, to break the morbid association of the symptoms, and induce a speedy remission; for I am convinced, that it is less by its unloading the vessels, than by the *shock* (I cannot express it in philosophical language) which it gives to the whole system, nervous as well as vascular, that blood-letting affords the magical relief I have so often witnessed. It is also by the inexplicable changes implied in the word *shock*, that cold affusion operates advantageously; for, in tropical climates, where the temperature of *sea-water* is generally from 80 to 82 degrees, its refrigerating power must be much abated.

The state of the pulse is less to be regarded than the urgency of the other symptoms; even when the former is thready or undulating, the latter often imperiously demand renewed depletion; and their demand must be complied with at all hazards. In a disease like this, where the danger is frequently imminent in twelve or twenty-four hours, it is amazing how much its apparent character may be altered by active depletion. From a fever of the highest grade, management will change its complexion to one of the second or third order. To secure every chance of such success, no attention must be spared; the patient ought to be seen every two hours; and, whenever the febrile symptoms get up anew, new exertions must forthwith be made to subdue them.

It is an Herculean disease, and, without that almost omnipotent remedy, the lancet, we might be said to encounter it unarmed; for all other means are but of secondary force. It requires all the vigour and activity imaginable, else it will gain ground on us with rapid strides. A practitioner who will not bleed largely in the onset, will soon feel himself in the melancholy predicament of the celebrated *Julian the Apos-*

tate,* who was hurried into battle with an active and unrelenting enemy before he had buckled on his armour, or prepared himself for his defence. Like Julian, he will feel his vantageless condition when it is too late, and will pay dearly (if he has sensibility), or at least his patient will pay dearly, the forfeit of such neglect; for be it remembered, that, in medicine no less than in politics, "Quicquid delirant reges, plectuntur Achivi."

In this disease, therefore, it is indispensable to bleed again and again:—It is the main stay,—the sheet-anchor of hope. Without it, many, very many must infallibly be lost;—would that I could say that by it *all* are saved! But when it is recollected how often inflammation, even of parts not vital, foils all our exertions at resolution, it cannot be wondered at, if blood-letting is often incompetent to remove inflammation of the brain or abdominal viscera, organs endowed with high sensibility, extensive sympathy, and functions whose right performance is essential to life.

I cannot undertake to go minutely into all the happy results† of this decisive practice; in fact, it is the less necessary for me to do so, as it obtains so generally amongst surgeons employed in the service of their country in tropical climates,

* For the death of Julian, and the manner of it, see the elegant narrative of *Ammianu Marcellinus* (Hist. Lib. xxx.), as also Mr. Gibbon's interesting account.

† It is remarked that patients who have been ill of fever are apt afterwards to die of dysentery or chronic complaints. Though thirty-seven of the crew of the frigate to which I belong laboured under ardent fever on the Jamaica station, and though the ship afterwards suffered a good deal from dysentery in the Gulf of Mexico, none of the thirty survivors died of that or any other subsequent disease. It is therefore another praise of the depletory practice, that it leaves no visceral obstructions to be a source of after danger.

I shall here mention a farther indirect advantage arising from this method. In the early stage of ardent fever there is often a torpor of the bowels, which renders them insensible to the stimulus of purgatives. When bleeding is practised, either while the blood flows, or immediately after recovering from syncope, the cathartic previously given produces urgent calls to the seat and full purging. Venæsection certainly renders the body more susceptible of the action of blisters also.

and has become such a favourite method, that, instead of an unguarded hortatory tone, it would perhaps be well to put in a *caveat* against the abuse of this most potent remedy. Of such abuse, I cannot say I have seen any example; but some friends, on whose judgment I place great reliance, have informed me that they have occasionally witnessed detraction of blood pushed to an unseasonable and improper length. This I can well believe, having felt by experience, that the great difficulty in treating this fever is to say *when* active evacuations ought to be laid aside. The exact decision of this point requires considerable *tact*, and a previous acquaintance with successive phenomena of the disease.

Purging, free purging, I have not hitherto mentioned, its necessity being so much a matter of course. A stimulus ought to be kept up constantly on the bowels, if with no other view than to relieve the head. Blisters and the cold affusion I have found to be valuable auxiliary remedies:—I call the latter by the subordinate epithet of *auxiliary*, for to attempt (as some have fondly hoped) to extinguish this most violent fever by *it*, is like attempting to extinguish the crater of mount Ætna by water! It, however, reduces heat and invites sleep, and (what is of very great consequence) by its bracing power on the skin, it gives tone to the stomach, lessening nausea, and checking vomiting, a thing so much to be dreaded in every stage of this disease. With the latter view, also, I have found saline effervescing draughts, and small oft-repeated doses of calomel, highly useful.

These remedies are mentioned in succession according to their relative efficiency, but, in actual practice, their application must be contemporaneous. Bleeding, purging, cold lotions to the head, shaving the scalp, and general refrigeration by the cold bath, must be drawn up together in array against the disease, and must make a combined attack. A first or even a second disappointment must not rob us of our perseverance. Courage and constancy will in the end often succeed against great seeming odds. In short, the violent excitement must be got under by all means, ordinary and extraordinary.

I have never either tried or trusted to calomel as a *siala-*

gogue in this disease. The blind confidence in its supposed specific power has, I believe, nearly faded away before the better lights and the more speedy results which the depletory practice has afforded.* In ardent fever, where there is a morbid activity of the arterial, with a proportional inactivity (almost amounting to torpor) of the venous and absorbent systems, it is a matter of extreme uncertainty, whether mercurials can find their way into the system, until the paroxysm of fever is dissolved. Its action, even were it absorbed, would be rather hurtful, as favouring that depravation of the solids and solution of the fluids, which, with the effect, putrescency, are so much to be feared in the latter end of continued fevers. Upon the whole, longer time and trials have only given additional strength to the opinion which Dr. Saunders pronounced on the inutility of mercury in the endemial fevers of tropical countries.

In the cases that came under my care, I have been in the habit of giving three or four grains of calomel after the primary stage of fever, every three or four hours, with the view of deriving from the head and viscera, by keeping up a constant action on the intestinal canal, as also to carry off sordes, and to prevent vomiting. I preferred calomel, because, from the precarious state of the stomach, more bulky or more nauseous cathartics could not, in all likelihood, be retained. When low delirium, coma, torpor, or the like, occur, it may be desirable, as a last resource, to place the system under the influence of mercury; but, even under these circumstances (though the

* An attempt has lately been made to *clap up a match* betwixt the depletory and mercurial methods, and to call in the aid of both in the same case. The most respectable, if not the original proposer of this incongruous union, is Mr. Johnson, in his valuable work before referred to (see note, p. 429). What table of affinities suggested this coalition, it would be vain to conjecture.

However ingeniously devised this combined system may be, it will never stand. Like the famous image in the vision of the prophet Daniel, it is formed of repulsive materials: the *iron* and *clay* will not coalesce—cannot amalgamate,—but the baser matter will crumble to dust, leaving the other part to the enjoyment of proud perpetuity. The separation doubtless will be spontaneous, and the sooner it takes place the better.

mouth was fairly affected), I have never been so fortunate as to see it of any avail in saving life.

Much has been said about the prophylactic virtue of this mineral in warding off the attack of fever. No one will deny that a mercurial course, by lowering the tone of the constitution, lessens the liability to this as well as all other inflammatory diseases; but some cases in point have fallen under my care, where men have been suddenly attacked with severe symptoms of the endemic, whose systems, for a week before, had been saturated with mercury on account of a venereal complaint. I therefore suspect that the influence of this metal, as a preventive of tropical fever, is like that of the eruption of prickly heat (Lichen tropicus) on the skin, founded in error: the latter, I know from repeated experience, has no other basis than hasty popular opinion.

It would be easy to extend these remarks on fever to a greater length; but I have endeavoured to confine myself to leading points, and to those opinions of late authors which seemed to admit farther elucidation. I am not altogether without hopes, that, notwithstanding the low standard of merit in which this communication must rank itself, perhaps I have furnished here and there a *raw material*, which may be *worked up* into something of utility; or a hint which, even without any such expectation on *my* part, may be converted by others to the improvement of our profession, for which, in my humble sphere, I trust I am not without zeal and devotedness. At all events, a delineation of the disease on a great scale, and a detail of practical facts, can never be wholly useless; and I can only say, that I have described such facts and occurrences accurately, as far as my means of information reached.

Account of an Hydraulic Machine for raising Water, called the "Water Ram." By John Millington, Esq.

[From the Journal of Science and the Arts, No. II, for 1816.]

Among the various necessaries of life, nothing is more conducive to the health and comfort of mankind, than a plentiful and regular supply of water for domestic purposes; but this convenience is often withheld from those who live at a distance from towns, or the usual machinery for supplying water, notwithstanding they may possess it abundantly in their neighbouring springs or rivulets; which, from their low situations, preclude the possibility of using or obtaining it in any other way, than by actual transportation in carts or buckets. The expense of erecting horse-pumps or steam-engines is too great to admit of their general use in individual establishments. With a view to obviate these difficulties, and add to the comfort of those who may be deprived of the luxury of water, I beg to send you an account of a very simple self-acting engine, which is but little known in this country, though it has been several times beneficially used in France; and from the simplicity and certainty of its action, I am sure it only requires to be known and adopted to be approved.

The *belier hydraulique*, or water ram, as this machine was called by Mongolfier, who first constructed it about 1797, is applicable to any situation in which there is a fall of a few feet of clear water, and drainage to get rid of the superfluous quantity: and as it is simple and cheap in its construction, and requires no attendance after it is once adjusted and set to work, it is particularly applicable to the supply of houses or gardens, and pleasure grounds situated upon elevations.

The action of the water ram, as will be seen in the following description of it, is entirely dependent upon the momentum which water, in common with all other matter, acquires by moving; a circumstance which has often proved very detrimental and troublesome to plumbers and others, in fixing pipes connected with elevated cisterns.

It may have been observed by many, on turning a cock attached to a pipe so circumstanced, that the water flows with great violence; and upon shutting it off suddenly, a concussion is felt, the pipe is shaken, with a noise resembling the fall of a piece of metal within it, and the pipe is not unfrequently burst open near its end. This arises from the new energy which the water has acquired by being put in motion for a short time and then stopped, in consequence of which it makes a considerable mechanical effort against that end of the pipe which opposes its further progress.

This effect was experienced in a great degree at an hospital in Bristol, where a plumber was employed to fix a leaden pipe to convey water from the middle of the building to the kitchen below; and it was found, that nearly every time the cock was made use of, the pipe was burst at its lowest end; after making many attempts to remedy this evil, it was at last determined to solder a small pipe immediately behind the cock, which of course was carried to the same perpendicular height as the supplying cistern, to prevent the water running to waste, and now it was found that on shutting the cock the pipe did not burst as before, but a jet of considerable height was forced from the upper end of this new pipe. It therefore became necessary to increase the height of the pipe, to overcome, if possible, this jet, and it was carried to the top of the building, or twice the height of the supplying cistern; where, to the great surprise of those who constructed the work, the jet still made its appearance, though not in such considerable quantities; and a cistern was placed at the top of the house to receive this superfluous water, which was found very convenient, particularly as it was raised without trouble or exertion.

This is, I believe, the first water ram which ever had existence, the circumstance having taken place prior to Mongolfier's contrivance, though he is the first person who organised the machine and made it completely self-acting, without ever turning a cock. His construction is represented in the Plate, where A is a cistern (or part of a running brook which may be dammed up to make a head of water), and B C a quantity

of iron or wooden pipes extending from 18 to 30, or 40 feet in length, according to their diameter, to conduct the water away: these pipes are laid in a sloping direction, so as to reach the greatest depth D at which the water can run off, which may be from one to six, or eight feet below the head A. The water would naturally run to waste from the end E of these pipes; but that is closed by a blank or solid flaunch, and it is only permitted to escape through a round hole in the centre of the horizontal flaunch F, from whence it will run in an uninterrupted stream. This hole is, however, equipped with a valve within it, as at *f*, and this valve is so adjusted as to sink by its own weight in the water, while that water is motionless or moving slowly. Now if we suppose the pipe B C D to be supplied with water from A, that water will at first pass round the valve, and discharges itself at F; but as soon as it has acquired a small additional force by moving, it will be more than equivalent to the weight of the valve f, and will lift it, by which the passage of the water becomes instantly stopped, and an effort will be made to burst the pipe D; this is prevented by the second orifice over the letter D, communicating with the chamber G and air-vessel H, from whence there is an immediate communication by the pipe I I I, with the elevated situations to which the water is to be thrown. As the effect of the blow which the water makes is instantaneous, it becomes necessary to place a second valve *v* between the air vessel and the chamber G, but below the pipe I I, so that any water which is thrown into H by the effort may be confined there, and acted upon by the condensed air, instead of permiting it to return and equalize itself in the pipes C, D. The blow which the water makes is so sudden and violent, as to produce an expansion in the pipe D, which is as suddenly succeeded by a recontraction and trifling vacuum in D, by the tendency of the water to return up C when stopped; the effect of this is to bring down the valve f, by which a free passage is once more opened for the water, which again flows and shuts *f* as before, to produce another blow or pulsation, by which a second quantity of water is thrown up I I. Each repetition of this operation affords a fresh supply of water.

It will be evident that the valve *f*, as well as *v*, will require some adjustment as to weight. This is effected by making these valves of hollow brass balls, having a hole on one side, by which some shot or small pieces of metal can be introduced to adjust the weight. The hole is afterwards stopped by a screw which projects and forms a shank or tail to guide the valve. The screw over *v* is likewise to adjust the height to which that valve should ris , and to prevent its breaking away and getting into the air vessel, which it otherwise might do from the violence of the blow.

It has been found, that after using the water ram for a short time as it was formerly constructed, the air in H became absorbed and entirely disappeared, and by its ceasing to act as an air vessel, the water would not proceed to any great height up I I. This is obviated in the present case by the chamber G placed between the air vessel and the pipe D. From the form of this chamber any air which enters it becomes confined in the recesses K K, and not only equalizes the action on the vale *v*, but makes the whole motion less instantaneous. K K becomes supplied with air in small machines by the falling of the valve *f*, which brings a small quantity of air down with it. In larger ones it will be necessary to apply a small shifting valve, or spring valve opening inwards to some part of the outside of G, when the air as it enters will rise to the top of K K, and as it accumulates will at length pass through *v* into H and keep it supplied with air. This latter contrivance I believe originated with Mr. Dobson, of Mortimer-street, Cavendish-square, who has paid considerable attention to the improvement of this engine, and proposes erecting them for the public.

In the rams which I have seen, the tubes B, C, D, have been from $1\frac{1}{2}$ inch to 4 inches diameter, and the ascending pipes I I, one inch, or rather less. I have seen the valve *f* make from 50 to 70 pulsations in a minute, and I should think discharging near half a pint of water at each pulsation, at the height of 30 feet with a six feet head. I am, however, told that a machine has been made which furnishes an hundred

hogsheads of water in 24 hours, to the height of 134 feet perpendicular, with a fall of four feet and an half.

I am not aware that the best proportion of parts has yet been ascertained, or the quantity of loss compared with the quantity delivered up I I, which must in a great measure depend upon the heights of the respective heads, and the size and length of B C compared with the perpendicular fall from A to D. I intend entering into an examination of these points, and if you should think the result of my enquiries worth inserting in a future number of your Journal, they shall be very much at your service.

I remain, dear sir,

Your's very truly,

JOHN MILLINGTON.

Upper Mall, Hammersmith,
10th June, 1816.

Some Remarks on the Arts of India, with miscellaneous Observations on various Subjects. By H. Scott, M. D.

[From the Journal of Science and the Arts, No. II, for 1816.]

During a long residence in India, I communicated to Sir Joseph Banks some observations that I had made on the arts of that country, and I intermixed occasionally some speculations of my own. He kindly sent replies to my letters, and took a very active part in endeavouring to promote several of their objects.

He lately told me that a part of my communications had not been without effect, while others had made no progress. Men slowly alter their habits, and receive, perhaps wisely, whatever is new with reluctance and distrust.

Among the new objects to which he referred as having done some good, he mentioned to me the Wootz, or Indian steel. This steel is now acknowledged to be of an excellent quality,

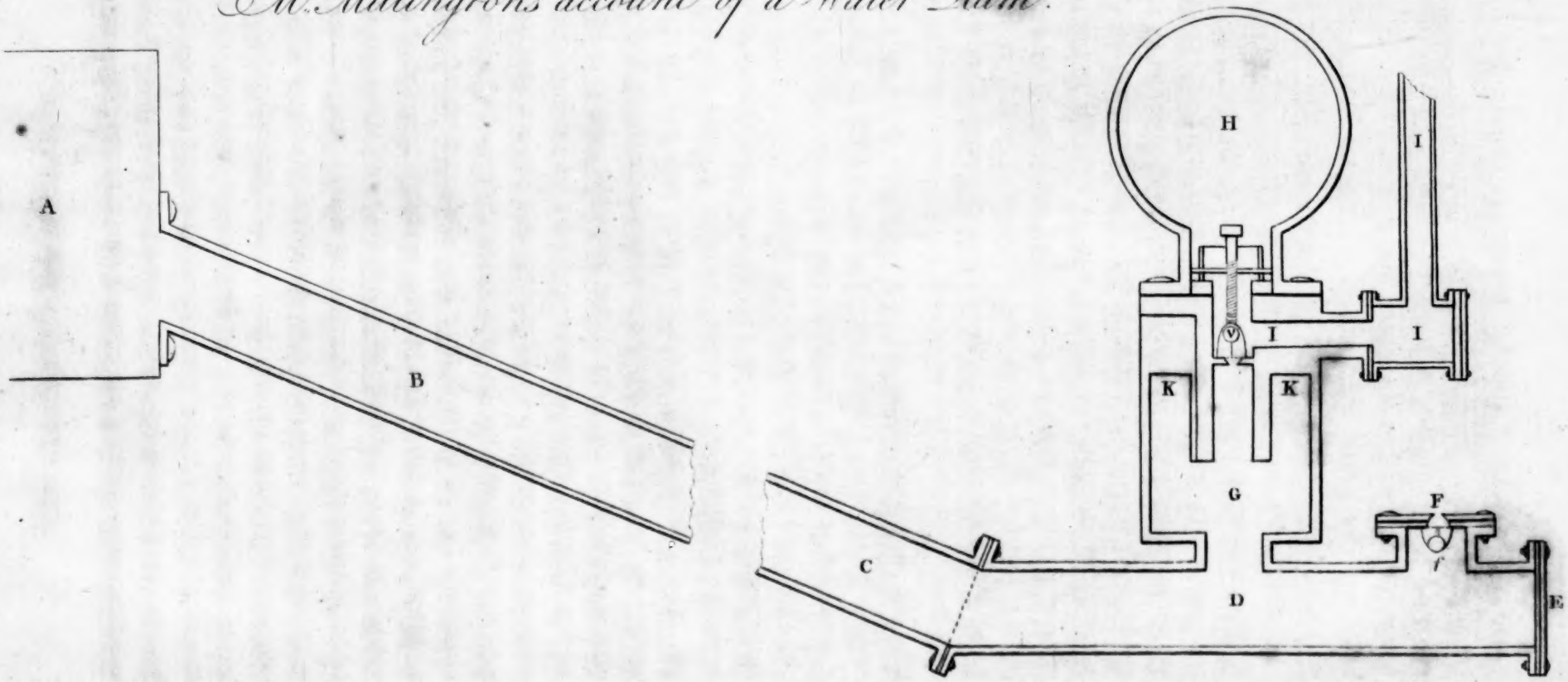
and better fitted for some purposes than any other yet known. After many ineffectual attempts to work it, it is now made into surgeon's instruments, razors, &c.

He next mentioned the operation for the restoration of the Nose, which has been performed in this country in consequence of a communication of mine to him. My letter was plundered of its contents, and before it reached him the publication of that part of it which regarded the nose was made in the Gentleman's Magazine for 1794. The account that I there gave of the operation was republished by M. Tennant, with some most extraordinary opinions of his own. I believe that Mr. Carpue will acknowledge, that without the assistance of my communication he never would have ventured on the bold operations which he so happily performed, acquainted as he might be with the method of the Italians and the ample volume of Taliacotius. In all this I claim little merit, farther than that of being the first person to give an intelligible account of an operation that cannot have been quite unheard of by my countrymen in India for many years past. On this occasion and many others I have thought (if we are to judge from experience), that it is as difficult to detect and to appreciate the practice of a simple art in India, as to discover a law of nature.

Among the things too that have made some progress in society, Sir Joseph mentioned the nitric acid; concluding the conversation with requesting me to publish an account of some of the facts that I had detailed to him on various subjects. With regard to arts so ancient as those of India, he thought that a knowledge of them would afford at least some gratification to rational curiosity. In compliance with this desire, I shall detail in as few words as I am able some parts of the correspondence to which I have alluded.

I mean in the present paper to confine myself chiefly to a detail of some of the effects that I have observed from diluted nitric acid taken internally, and used as a bath for a variety of diseases. The field is far too extensive to be well surveyed by me, or indeed by any one individual, and I must rest satisfied with a very general sketch. Though conscious of being quite

Mr. Millingtons account of a Water Ram.



unequal to the task, I am carried on by the belief that no other person has yet had the same means of judging, and from the conviction that by the "*harmless remedies that I now recommend much good may be done in some diseases that are acknowledged to be beyond the ordinary means of relief.*"

It is well known that climate alters much the phenomena and the nature of the diseases to which the human body is liable. A great part of my life has been spent between the tropics, where the temperature is generally high, where the vegetable world in its genera and species puts on appearances that are quite new to the inhabitant of Europe, where the animals are generally very different, and where the diseases by which they are afflicted arise from other causes and with different symptoms. I have often thought that it would be curious and useful to mark, from sufficient experience, the peculiar maladies to which we are subject in a hot climate, as well as those from which we are exempt. If this were done with skill, it might give rise to a number of important conclusions both for avoiding and curing diseases.

Cancer is nearly unknown within the tropics. During twenty-five years I saw one case of cancer in a person who had brought the rudiments of the disease from Europe. From that case I learned the afflicting truth, that although a hot climate does generally prevent the formation of cancer, yet, when once it is formed, it does not cure it. I saw, in another instance, a cancer arise in India with an European gentleman, from often pulling the hairs from a wart on the skin of the cheek, and which produced at last the most deplorable effects. If such a complaint had appeared in any natives of the country, whatever might have been their cast or condition, I should probably have seen or heard of it.

Phthisis pulmonalis is not common in that climate, although it does occasionally appear. The true Phthisis is certainly a rarer disease there than many European practitioners suppose, for the lungs very often suffer from abscess and affections of the liver; and it is no easy matter to distinguish such complaints from the true phthisis pulmonalis.

Scrofula is rare, though particular causes do sometimes

produce it. Cold and moisture seem to be the great sources of the scrofulous diathesis, for the children of Indians, and even the ape kind, although free from the disease in their native climate, are very liable to scrofulous affections on being brought to Europe. Would it not appear then, that similar causes have a tendency to produce phthisis pulmonalis, scrofula, scirrhus, and cancer, and that there is some connection in their origin, and perhaps in their nature?

I never knew an instance of a biliary stone being found in the gall bladder or the biliary ducts, in India.

The formation of stone in the urinary bladder is nearly unknown between the tropics. I have indeed not met with a single instance of it, although I have known some cases where such a disease was imported and not removed, by climate. This exemption, however, from those dreadful diseases does not extend through a great extent of latitude; and it should also be remembered that altitude above the sea has similar effects to a more northern latitude. I speak of my experience in a country on a level nearly with the ocean, and having a barrier of ghauts or mountains towards the east. In the northern parts of India the maladies of Europe begin to show themselves. I knew a boy who got a stone in the bladder in Guzurat, for which he had been cut by a native surgeon. The perforation was made in nearly the same place that it is in Europe, and the operation was what is called, I think, by the *Gripe*.

I may take notice here of a case of stone in the bladder (it cannot be too often mentioned) which was remarkable for the singular mode of cure adopted by Colonel Martine, himself the sufferer. He then resided at Lucknow, but I believe the Colonel had lived in many of the northern parts of Hindostan. I knew well a surgeon* of the Company's service, who was intimate with the Colonel, and visited him at all hours, and often saw him carrying on his process for cure. It consisted in reducing the stone to powder, by a fine saw introduced through the urethra by means of a canula, and he

* Mr. Bright.

perfectly succeeded in removing the whole of it. The Colonel was an ingenious mechanic. His saw was made of the steel spring of a watch. He introduced the canula till it touched the stone; and then, by changing the position of his body, he pushed on the saw till it was, for a little way, in contact with the stone, and then moving it backwards and forwards, he reduced it to powder. My friend often saw him at this work, and occasionally more than once on the same day. The operation gave him no pain whatever; for soft parts plentifully covered with mucus, are under very different circumstances from hard and resisting bodies, and completely elude the teeth of so fine a saw. Soon after every sawing, he passed with his urine a quantity of the stone in the form of a powder. Although a parallel case will not often occur, where the patient is so intelligent and ingenious, and the final success so decisive, yet by long habit and guided by feelings known only to the individual, I should hope that a similar mode might *sometimes* be applied with advantage. No surgeon can effect this for another person. To place the stone and the saw in the proper positions, and to carry on the operation with success and without pain or injury, can only be done by the patient himself. The hopes of relief, the attentions and observations necessary to attain it, the repeated trials, with all the sources of employment and of comfort to a miserable man, may well reward him, even if the perfect success of Colonel Martine should be unattainable.*

Although a tropical climate does not at all times prevent the attacks of gout, yet they certainly are less common and severe than in cold countries.

* Since writing the above I have conversed with a very intelligent officer of high rank, who knew the Colonel intimately. He tells me that the instrument for reducing the stone to powder was rather a file than a saw, and that it was fixed to the end of a piece of whale bone. It was passed into the bladder through a canula. So accurately from habit could the Colonel judge of every circumstance, that he could tell when any part of the surface of the stone became more elevated than the rest, and could remove that part with the greatest nicety. On speaking to a friend now in town, who also was intimate with the Colonel, he was told, that the filing part of the instrument was made of a knitting needle, properly tempered for the purpose.

Acute rheumatism is rare between the tropics, but cases of it do occasionally occur. In like manner, the chronic kind is sometimes met with in India, and is more easily cured than in Europe.

While the glands, that are the common seat of scrofula, are less generally diseased between the tropics than here, other glands suffer there more frequently than in Europe, and in particular the liver and spleen. I have fancied at times that I could see mechanical causes for some of the derangements of the liver in a hot climate. The resinous matter of the bile seems to be there more abundant. It appears occasionally to separate, from its union with soda, when it stagnates in the liver and enlarges it, giving rise to all the phenomena of chronic hepatitis. By some means the calces of mercury stimulate that organ, or they give solubility to this resinous matter, which then passes through the ducts to the intestines. Such a bilious discharge, from the use of mercury, is the true signal of relief. When from long illness or other means weakness is produced, with a languid circulation, chronic hepatitis is almost a certain consequence. The vis a tergo in the liver is diminished, depositions take place, and I have seen after death resinous and spermaceti-like matter choaking and obstructing the ordinary course of the circulation, and greatly enlarging the whole mass. It is said, that in some parts of Germany the overgrown livers of geese and ducks are esteemed a great delicacy for the table. In order to produce them, they fix the animal by the feet to a board; they keep it motionless in a high temperature, and force it to swallow a great deal of nourishment. This is the case occasionally with our countrymen in India; a high temperature, little motion, with a plentiful diet; and the very same consequences make their appearance. While a very languid circulation of the blood gives birth with certainty to chronic obstructions of the liver, acute hepatitis, on the contrary, is produced by all those causes which quicken the circulation beyond its proper rate. Such are violent exercise, fever, and hard drinking, and, I might add, steel, and tonics, and bark. From the peculiar structure of the liver, and the state of the circulation of its

blood, it cannot flow much more quickly than is natural with impunity. How often are boys seized with a pain in the region of the liver, after running with rapidity?

The calces of mercury do certainly give the utmost relief, both in acute and chronic hepatitis. While in the acute kind we employ between the tropics the antiphlogistic plan, blistering, blood letting, and especially purgatives, we ought not for a moment, if the disease is severe, to delay the use of the calces of mercury internally, with the ointment externally, as being of more consequence than all the other means in our power. No condition, to which human nature is exposed, is more deplorable than that where an abscess has taken place in the liver. I know of no sufficient security in that climate against such an evil but mercury. As soon as the mouth gets sufficiently affected, and the system is impregnated with it to a proper degree, the pain, the fever, and the distress abate, and the patient remains quite secure from the risk of abscess, provided we have not used the remedy too late, and when such a change has taken place as must necessarily end in abscess. While nobody is better acquainted with the inestimable benefits that arise from the due use of mercurials than myself, nobody can better know the ill consequences that follow them. In those predisposed to scrofula, they excite it; in those with a tendency to consumption, they accelerate it; and they have other bad consequences that I need not mention. When, however, we are threatened with the formation of matter in the liver, we must neglect all those considerations, and submit to smaller evils, in order to avoid one of the most melancholy kind.

When in India, I was most anxious to discover a substitute for the mercurial calces, less injurious and equally efficacious, and I have not been entirely without success. I knew that the nitric acid acts most readily on the resinous matter of the bile, and I was in hopes that I might communicate such an acidulous state to the living body as should produce the effects that I desired. That it may alter the nature of the urine has been proved by Mr. Brande, who has recommended the use of it in a particular kind of urinary calculus. If large secreting

glands are thus materially affected by merely drinking this acid, I cannot doubt but that by bathing the whole surface of the body below the head, in a very dilute nitric bath, much of it may be absorbed, and more material effects produced. I had found that through the medium of the stomach the effects of the acid, if given to the wished-for extent, might be injurious, and I had tried to little purpose to combine it with substances for which it has but a slight affinity, expecting by such combinations to diminish its action on the stomach without destroying its useful qualities. From its absorption by the skin, some effects have arisen that I think very important. We are destined to find our way by experience, and can never know to what an untried agent may lead us at last.

I gave, many years ago, a short account of my trials with the nitric acid in India. It was obtained there by means of alum from common crude Bengal saltpetre. In that country both alum and saltpetre are plentiful and cheap; but I could not obtain the sulphuric acid, unless from Europe, or by making it myself. In both cases it would have been expensive, from requiring either the payment of freight for a long voyage, or the expense of erecting a considerable apparatus. I was satisfied, therefore, with the acid procured, as I have said, from unrefined saltpetre and alum. I was aware that that acid was far from pure. I knew that it was mixed with a considerable proportion of muriatic acid, derived from the muriates which that saltpetre so plentifully contains. I had long given this acid internally, and I had found it harmless, and sometimes very useful. I was far from thinking at that time, nor did I suspect till long afterwards, that pure nitric acid is unequal to the production of all the benefits which I sometimes derived from my acid applied to the surface or to the stomach. A suspicion of this kind first arose from the circumstances that I must now explain, at the risk of being thought tedious. At that moment I lamented the impurity of my nitric acid, and I was sorry to use alum instead of sulphuric acid, although in the end both of those circumstances have been highly useful, by leading me to conclusions at which I never otherwise could have arrived.

At the Presidency of Bombay we have extensive works for gunpowder, from which the armies on that side of India, and occasionally the navy, are supplied with that material of war. The manufacture of this article had fallen into the hands of some Parsees, who, as in other cases, had some practical knowledge, but no kind of science, to direct them. Complaints of the gunpowder had become very general. It grew moist in the magazines, and did not, after keeping, answer to the common modes of proof. So very ignorant were those men, that they perpetually returned all the liquor remaining after the crystallizations of their saltpetre on the next quantity to be crystallized. They judged their saltpetre to be sufficiently pure and fit for gunpowder when they saw the crystals clear and transparent, and free from charcoal or mud. After a committee of intelligent officers had reported on this state of things, I was desired to take charge of those works, which I continued to hold till my departure from India. By adopting the necessary measures, our gunpowder soon became as good as any in the world. One of those changes (and it is what leads me to the present digression) was the purification of the saltpetre. I had read in the "Annales de Chimie" a proposal of M. Lavoisier to purify that article for gunpowder, by reducing it to powder and then washing it with two portions of water. These two washings were sufficient to dissolve nearly the whole of the deliquescent salts, with a certain portion of the nitre. This to us was not only a very effectual operation, but it was one profitable to the public, for by evaporating the liquor of the two washings we recovered a quantity of saltpetre, impure indeed, but when mixed with charcoal, &c. still fit for making fireworks for the celebration of the weddings of the natives. As during the state of warfare which prevailed at that time, it was judged proper to prohibit the importation of saltpetre for sale, the product of our washings was gladly purchased. After saltpetre has thus been carefully washed, it is perhaps free enough from saline impurities to be fit for gunpowder; but I have always given it one subsequent crystallization, fearing it might contain a little sand or other matter, by which a spark and an explosion might be produced.

Being at that time impressed with a belief that the effects of my acid on the human body arose entirely from the *nitric acid*, I thought it would be a great improvement if I distilled it, not, as usual, from the crude saltpetre, but from such as had been washed in the way I have mentioned. This practice I continued for a long time, and indeed until I left India. Since using this purer saltpetre, I have often imagined that some of its beneficial effects were no longer produced, or were less remarkable. But my means of observation were cut short, first by very bad health, and then by being obliged to leave India for this country. Until lately I had no opportunity of seeing the sick here, or of recommending remedies for them; but still the *suspicion* of my having diminished the power of the acid, by purifying the nitre, hung on my mind, and I resolved to put it to the test of experience, as soon as I might have it in my power. About seven months ago I came to London, and by the aid of some intelligent friends I have been able to ascertain facts that I think interesting. I have found that the acid produces many effects in this climate as readily as it did in India. For the reasons just stated, I have used in all my late trials, not the nitric acid, but an acid composed of three parts of nitric and one of muriatic acid. With the result of these trials I have been sufficiently satisfied; nor have I had reason to think, that a constitution broken down by disease, by the use of powerful remedies, such as mercury, or by the long continued action of the poison of syphilis, receives less benefit in this climate from the acid treatment than I have derived from it in India.

I long ago said that I had removed syphilitic affections by the nitric acid (it was rather the nitro-muriatic), which ad resisted mercury long and judiciously applied. I had combined the external with the internal use of the acid, and I succeeded, in some of those cases at least, which have been called pseudosyphilitic. This state of syphilis is thought by some able and eminent men to be a new disease, and arising rather from the consequences of the remedy than from the poison of syphilis still existing in the constitution. I know well that an indiscreet, or even a large use of mercury, may give rise to

much evil; but I may be permitted to say, that no skill nor prudence in the application of that remedy will at all times prevent the occurrence of pseudosyphilis. In it I believe that the poison of syphilis still exists, remaining occasionally dormant, and becoming, from unknown causes, active and injurious, and exerting again all its specific effects. I think, however, that the cause of pseudosyphilis is a scrofulous habit, acted upon at once by the poison of mercury and the poison of syphilis, for to such a habit of body they are both poisons. We cannot destroy the syphilitic virus without calling into action the scrofula, to which there is a predisposition, so that on the patient is entailed a new disease not less afflictive than either of those from which it arises. It may perhaps be thought some confirmation of this opinion, that during the whole of my residence in India, where mercury is so commonly, so largely, and sometimes so injudiciously given for affections of the liver, I never knew a single instance of this *new disease* having arisen where syphilis was *certainly* out of the question. That this sort of syphilis is very common in this country, is evident from the inspection of many of our public hospitals, where patients are often seen, who for years together have been subjected to many courses of mercury, and a variety of useless or hurtful remedies. Even in our streets many sufferers in this way must attract the notice of every medical man. It is not enough to say, that the nostrums of quacks, and the treatment of empyrics, have produced such evils. I have observed, that cases do occasionally occur where the utmost skill of the present times is found to be quite ineffectual. I now earnestly recommend the nitro-muriatic acid bath for this disease, a means yet untried in this country. I see that the nitric acid is given internally by many practitioners in Great Britain, and occasionally, I am assured, with advantage. The knowledge of this would sufficiently reward me for all the trouble I have bestowed on the subject, and here I might rest satisfied; but I wish still further to advance the use and the utility of the remedy. Like the calces of mercury this bath affects the gums and the salivary glands, giving rise occasionally to a plentiful ptyalism. Though it reddens the

gums, swells them, and renders them somewhat tender, it never produces that nauseous smell nor those fœtid ulcerations which arise from mercury; nor from the bath did I ever know the least injury arise to the teeth. If the gums are much affected from the bath, it is generally prudent to stop its use or to diminish the absorption, by exposing a smaller surface to it. If we go on with it too long, some inconvenience is experienced: a degree of restlessness takes place, and the patient says, that he does not feel himself so well as he ought to do. Beyond this point I have seen no degree of harm from this general and powerful agent, and even this disappears on discontinuing it for a short time. I know no other means that are capable of producing effects at once so salutary and so considerable, so free from injury, with so little inconvenience or disturbance.*

If the acid be employed for syphilis or pseudosyphilis, either by the stomach or the skin, I should consider every trial as quite inconclusive where a ptyalism, some affection of the gums, or some very evident constitutional effect had not arisen from it. As with mercury, the system should be kept charged with it for a longer or a shorter time, according to circumstances. Mercury never could have obtained the character of a specific for syphilis if it had been managed as the nitric acid has been, if it had been generally given in quantities so small by the mouth as even to leave it in doubt whether it is capable of affecting the gums and stimulating the salivary glands. Why should not the nitric acid receive the same privilege and indulgence that is conceded to mercury? It is still a stranger in this climate, and on that account requires the more care and attention. There is nothing absurd in supposing that nature may have many substances in store capable of destroying or removing the syphilitic poison from the con-

* In this climate it will be found convenient to bathe only the feet and the legs daily, or twice a day. For this purpose a wooden tub may be used. The water when accidulated with nitromuriatic acid should taste about as sour as vinegar, or it should be of such a strength as to prick the skin a little after being exposed to it for twenty minutes or half an hour.

stitution: I say, then, in the spirit of the illustrious Bacon, "fiat experimentum."

When I have removed a disease by the acid treatment that was regarded as undoubtedly syphilitic, I have been commonly told at last that we must have been mistaken, for that *nothing but mercury can cure syphilis.* I wish we had some chemical test for the existence of this poison in the body, that we might have more of the evidence of our senses and less of the wanderings of opinion. One of the states of syphilis, the least doubtful, is that of recent chancre, and this, though of a bad kind, I have seen in about a week completely removed by the bath.

There are no researches so difficult as those which regard the human body and the changes connected with life. The capacity of few men seems to me to be well adapted for them. The chemist may repeat his experiments as often as he pleases, he may vary them till he obtain results on which he can rely. It is very different indeed with the physician. The doubts and the darkness that surround him are in comparison tenfold. After all, it may be with myself that the whole of the errors lie: for who can judge of himself? I can believe that a man who is not of my opinion may be equally sincere with me. But the same appearances convey to each of us impressions of a very different kind. With such a person then I need not reason, and I will not dispute. I must ask him, as Rousseau did his antagonist, "What is there, sir, in common to you and to me by which we may be enabled to understand each other?"

I employed while in India the nitric acid by the mouth or as a bath for various complaints, as I never wished to confine it specifically to any one. I was anxious to get from experience a general rule for its application, and it was certainly not without some success that I used it for several diseased conditions of the body. I shall slightly mention a few of those complaints in which I have found it of advantage. For some affections of the skin I have derived benefit from the bath; it rapidly and effectually removes every sort of sores. This bath has the advantage of keeping perfectly unaltered for any length of time,

not suffering decomposition like water, and never emitting any kind of unwholesome effluvium. It is an agent that we employ with almost any degree of power. In those very weak and delicate I have plunged one arm into it only, or I have washed a portion of the skin with it. I have very often exposed the legs up to the knees in the bath, and by their means alone have been able to keep the mouth affected for a long time. When a greater power was required I have exposed the whole surface below the head to it. To all this may be added its internal use, if necessary.

Where the constitution has been weakened by fever or long continued disease, I have found in the nitric acid bath a tendency to renovate. It remarkably improves the complexion. In chronic hepatitis and a bilious disposition I have used it with much advantage. I have seen the happiest effects from it in aphthæ of the mouth and intestinal canal, where every other remedy had failed. This is sometimes a dreadful disease in India; is it the "cachexia aphthosa" of Dr. Latham? In many disorders of females, and in men worn out with obstinate intermittents, I have found it very useful. In short (and as a general rule), I have found the acid bath advantageous and salutary in all cases where mercury is useful, and with the additional advantage, that the acid treatment is attended by neither injury nor inconvenience.

As I had seen the good effects of nitric acid in pseudosyphilis, or that kind of syphilis that cannot be cured by mercury; and as I had long thought that pseudosyphilis arose from syphilis in some way combined with scrofula, I became anxious to know the effect of the acid treatment in pure scrofula. Since I came to London I have seen a number of trials made by different medical practitioners with the nitro-muriatic acid. Some of these cases were of long standing, and of the worst kind. The result on the whole has been very favourable, though none of the patients have yet used it for three months. In almost all the health has improved, and some of the sores have healed, or show a tendency to heal. I have not seen a cure effected in a single instance; but this could hardly have been expected; for where the disease is of long standing,

as with these patients, and where many glands are inflamed and enlarged, it is evident that a long time will be required to reduce them to the healthy state. I have seen remarkable relief in several people where the neck was much affected, much swollen, with many glands in a state of suppuration, so as to make the least motion painful and nearly impossible. In some of these the pain and swelling has much diminished, and a considerable degree of motion of the head is attainable without pain. In one girl in particular, who was reduced to a dying state, by merely drinking the acid, her health and strength have greatly improved, and the sores have healed or shown a tendency to heal. With experience so short and imperfect, I cannot venture to say more, than that it holds out a hope of relief for some states of that cruel disease.

I have just seen Mr. Carmichael's book on Scrofula, which contains some just observations; and he seems to prove, that a disorder of the digestive organs is often connected with it. The utility of the practice that I have mentioned is very consistent with his idea of an acidity prevalent in the primæ viæ, for the mineral acids are known powerfully to counteract such a tendency, by giving tone to the organs of digestion. This disease has been the source of gross empyricism; for at different times almost every product of nature or of art has been extolled for the cure of it. The boasted baths of the Greeks and Romans could produce little farther effect than what arises from hot or cold water, and are often nothing more than the mere semblance of doing something.

Of all the remedies for scrofula, those substances that contain chlorine *seem* to have been the most successful. Such are sea-water, sea-air, the muriates of lime, &c. &c. Sir Humphrey Davy has shewn in a very late paper, that the nitro-muriatic acid (the aqua regia of the old chemists) is not a mere mixture of nitric and muriatic acids. On the contrary, from their union a quantity of pure chlorine is evolved, and water and nitrous acid gas (the results of the new affinities) are produced. Is chlorine a material agent in my bath? If I were sure of this I might mix the acids, so as to produce it still more abundantly. It has always been observed that calomel and cor-

rosive sublimate are the most active preparations of mercury, perhaps from the chlorine held in the compound. Chlorine is now known to be an elementary body of the greatest activity, of the powers of which over diseases we are nearly in total ignorance.

I have for many years past given euchlorine for several diseases, combined in its nascent state with soda. It contains oxygen very abundantly, and in a loose state of chemical combination. I meant it as a substitute for the nitric acid, and it is a very good one. Although Sir Humphrey Davy had not at that time shown us the composition of euchlorine, I saw that I was in possession of a valuable substance, which I have never since ceased to use. Mr. Brande has had the kindness to prepare for me portions of this compound, and he has shown me an easier and a cheaper method of making it for common use, than the one which I was in the habit of employing. But I must defer what I have to say of this substitute for the nitric acid to another time.

I have thus concluded what I intended to communicate on a subject of great importance. I have recommended from experience the practice of charging the body with some of the mineral acids or their elements for various states of disease, by the stomach, and especially by the skin. I may be weak, or I may be wrong, but I have acted from conviction; and I cannot but hope that an abler mind and a happier day will yet confirm and extend the truths that I have but slightly touched upon.

"Alter erit tum Tiphys!"

H. SCOTT.

38, *Russel-square*, *May* 8, 1816.

Account of a Soda Lake in South America. By M. PALACIO FAXAR. *Transmitted to the Editor by* Charles König, *Esq. of the British Museum.*

[From the Journal of Science and the Arts, No. II, for 1816.]

IN Maracaybo, one of the provinces of Venezuela (48 miles east of Merida, about 8 degrees of N. L. and 70 degrees some minutes of W. Lon.), is a valley, called by the natives *Lalagunilla*, the small lake. On the south of this valley, which contains an extent of country seven miles in length and five in breadth, runs that branch of the Andes which extends along the coast of Venezuela, and rising in this spot to the line of perpetual snow, forms La Sierra Nevada of Merida.

The waters that descend northwards from La Sierra unite to form the river Chama, which traverses the neighbouring countries, Mucuchies, Merida, Exido, Lalagunilla, and Estanques, and loses itself in the woods which surround the lake of Maracaybo. Those, on the contrary, which descend southwards from the Cordilliera are received by several rivers communicating with the Apure, which falls into the Oronoco. At a considerable height northwards, on La Sierra, is found the species of Cinchona, known in commerce by the appellation of Cinchona of Carthagena.

The north side of Lalagunilla is bounded by a limestone hill. The land rises imperceptibly towards the east and descends gradually several fathoms towards the west, until it reaches that tract of country which produces the Cacao (cocos butiracea.) The bed of the valley is formed of chalk; it is situated about 250 fathoms above the level of the sea.

The village of Lalagunilla is situate in the south of the valley; its inhabitants, a strong laborious people, are Indians, whose only occupation is agriculture and the extraction of the *Urao*.

Nearly in the centre of the valley is the lake which receives the rain water that descends from the neighbouring moun-

tains; but as even during the greatest drought the lake never becomes dry, it is supposed that it has some springs which supply it with water, independent of the rains. Its dimensions in the rainy season, in the widest part, are two hundred and ten fathoms by one hundred and six. On the eastern side, where the waters are deepest, its depth never exceeds three fathoms. To prevent inundations to the neighbouring cottages, a drain is cut on the south-east side, which carries the waters into the Chama. On the eastern side the waters are very shallow, and being contracted in width, give to the lake a somewhat oval form. It is on this side that many aquatic plants are found. The air of the valley being very dry, the climate mild, the sky serene, the country in a high state of cultivation, and the view of La Sierra Nevada truly sublime, a residence here is delightful, and many families from Merida and the environs constantly pass some months of the year at Lalagunilla.

The waters of the lake are impregnated with carbonate of soda, which crystallizes in the dry season, and is in that state by the Indians called *Urao*. The extraction of this salt, which is employed at Venezuela to prepare the Mò or inspissated juice of tobacco, has been long known and practised at Lalagunilla. At the end of the last century, when the court of Madrid monopolized the cultivation of tobacco, the right of extracting the Urao fell likewise to the crown. On the east side of the lake a magazine was erected for receiving the Urao, and another building as a residence for the *Teniente visitador*, or captain of Gens d'armes, in whom was vested the government of the lake, with a view to prevent a species of smuggling which the Indians are much inclined to practise, by secretly withdrawing the Urao.

The water of the lake is of a yellowish green colour, of a saponaceous quality, alkaline taste, and peculiar smell. There is no appearance of fish of any kind in these waters; the only living creature I could observe was an insect on the borders of the lake, which appeared to me a species of spider.

These waters having a strengthening quality, convalescents resort thither in the morning to bathe, and derive great bene-

fit from them in some cutaneous diseases. In many disorders incident to horses they are likewise very efficacious.

When the period for the extraction of the Urao arrives, which is every two years, those Indians of Lalagunilla, who are devoted to this employment, and who are called Huragueros, are embodied at the residence of the Teniente visitador. The Indians employed at this work are easily distinguished, by their hair becoming red. Being embodied, they proceed, in presence of the Gens d'armes, to sound the lake with a long pole, at the end of which is fixed a bar of iron, which serves to break the mineral. Having by these means found the parts where the Urao is most copiously deposited, they divide themselves into different parties (quadrillas), for the sake of facilitating their labour. Each party, composed of eight, ten, or more Indians, fixes a pole in the centre of the district allotted to them. Supported by this pole, the Huragueros plunge into the lake, and beginning by separating a bed of earth which covers the mineral, they proceed to break the Urao. When they suppose that a considerable part of the Urao is separated from the mass, they dive for it, and then rising again above the water, place it in very small canoes (piraguitas), which float round the spot. As there are several Indians who explore the same mine, the work goes on without interruption, but the same Huraguero is not able to plunge many times successively. The work, which begins early, and always in presence of the Gens d'armes, who are stationed on the borders of the lake, ceases at six o'clock in the afternoon, when the produce of the day's labour is deposited in the royal magazine, and is afterwards exposed to the heat of the sun.

The extraction, which lasts nearly two months, produces from 1000 to 1600 hundred weight of Urao, which is the quantity consumed in two years at Venezuela; but if more were required the lake would probably furnish upwards of four times that quantity. The difficulty of extracting the Urao may easily be imagined, but what is much worse, considerable danger attends it. If the Indian diver happen to lose his hold of the pole, or if some other accident prevent his rising promptly

to the surface of the water, and indeed, the Indians of Lalagunilla are in general but indifferent divers, he is in danger of swallowing more or less of the alkaline solution. If the quantity drank be inconsiderable the bad consequences may be trifling; but if he happen to drink largely, he cannot survive it many days. Oil has been had recourse to in vain. Acetic acid might, perhaps, in such cases be administered with better effect. Father Rendon proposed, in 1808, to the Captain-general of Caraccas, to effect the extraction of the Urao by sinking a caisson, which when properly secured should be opened at bottom to get at the soda. This project, which undoubtedly at low water might be realised at a small expense, was rejected as impracticable.

When the extraction of the Urao is completed the superintendent of the tobacco, who resides at Merida, repairs to Lalagunilla, accompanied by the Teniente visitador and others. The salt is weighed and paid for in the proportion of about one real of plata (about seven-pence) the pound. It is then conveyed into the general storehouse for tobacco at Guanare, in the province of Caraccas, whence it is distributed to the lesser warehouses.

If a heap of tobacco leaves covered with the green leaves of other plants be exposed to the sun for a few days, the tobacco begins to ferment. If then put into a press a red liquor may be drawn from it, the exhalations of which are intoxicating, and its taste very pungent. This juice drawn from the tobacco is called Anvir, but when reduced to a syrup, by evaporation, it is termed Mò. If the Mò be mixed with the Urao when dried, roasted, and pulverised, it forms the Mò dulce, if the proportions be preserved of an ounce of Urao to a pound of Mò; or otherwise Chimò, if two or more ounces of Urao be mixed with a pound of Mò.

In the province of Venezuela, and especially in Barinas and part of Caraccas and Maracaybo, Mò is much used and likewise Chimò, which is kept in small horn boxes, and occasionally persons put a little into their mouths. The Mò, and especially the Chimò, produces a copious salivation, stimulating at the same time the nervous system, which in these

climes, where the senses are blunted by the excessive heat, is productive of a degree of pleasure.

It is likewise used in medicine for spasmodic complaints, which in these countries are both frequent and dangerous. It is said that a little Chimò held in the mouth protects swimmers from the electric power of the cramp fish (Trembladores.)

The sale of Tobacco, the Mò dulce, and Chimò, in the Captaincy-general of Venezuela, produced, in 1804, 700,000 piasters, after every expense attending it was paid.

I had the honour of transmitting last year to Baron Humboldt, in Paris, a specimen of the Urao, which Colonel Duran brought to Europe. It was analysed by M. Gay Lussac, who pronounced it to be natron, in no respect different from that found in the lakes of Egypt and Fezzan. The mass neither contains sulphuric nor boracic acid, but a little subcarbonate of ammonia. On comparing the Urao with common subcarbonate of soda, we find that it contains more carbonic acid and less water.

In the environs of Lalagunilla, as well as in the roads to Merida, and especially near the river Albarregas, there are some mountains which are very distinguishable among the others by their superior verdure, and by the abundance of some plants, principally the Rosa de Muerto; and precisely the same species of verdure and the same plants are found on the mountains where are the mines of rock salt at Zipaquira, and at Enemocon of Cundinamarca in New Granada. Finding these similarities, I may venture to form a conjecture that in the environs of Lalagunilla there must likewise exist muriate of soda; and this being ascertained it would perhaps contribute to explain the formation of natron at such a considerable height above the level of the sea, which is more than sixty leagues distant from Lalagunilla.

Proofs of the Bulam Fever attacking the Human Frame only once. By W. Pym, M. D. Inspector of Hospitals.

[From the Edinburgh Medical and Surgical Journal, for April, 1816.]

In my observations upon Bulam Fever, page 122, I have mentioned that all the officers and men quartered in Gibraltar during the prevalence of the fever in 1809, who had had it at a former period in the West Indies, escaped it.

And, at page 27, that, out of the whole civil population of the garrison (amounting to nearly 14,000), only 28 persons escaped an attack of it; and of this small number 12 had had it at a former period, either in America, in Spain, or in the West Indies.

At Gibraltar, during the prevalence of the disease, in the years 1810, 1813, and 1814, there was no well-authenticated instance of a second attack; every person escaped it who had had it at any former period. And this fact is now so well established there, that, among the quarantine regulations against the introduction of the disease this year (1815), all the troops who have not passed the disease are encamped, while those who have passed it are doing the duty of the town.

At Cadiz, Carthagena, and Malaga, the fact of persons not being liable to a second attack of this disease is considered to be as firmly established as it is in small-pox.

The following circumstantial evidence respecting the malady at Gibraltar in 1804, establishes the fact beyond a doubt. In the corps of Royal Artillery, there were only two officers who escaped an attack of it, viz. General Smith and Captain Campbell, both of whom had had it some time before in the West Indies.

In the corps of Royal Engineers, there was only one officer, viz. Captain Thackery, who had had it in the West Indies; and he was the only one who escaped it, excepting Colonel Fyers, who kept himself and family in quarantine.

In the 2d, or Queen's Regiment, there were five officers,

viz. Colonel Jones, Major Kingsbury, Captain Walsh, Paymaster Wainwright, and Assistant-Surgeon Borlase, who had had it in the West Indies, and all escaped it, when every other officer in the regiment was attacked by it.

In the 10th Regiment, every officer was attacked by it, excepting Captain Carpenter, who had had it in the West Indies.

In the 13th Regiment, there were seven officers, viz. Lieutenant-Colonels the Honourable C. Colville, Dance, Scott, Major Belford, Captain Wilkinson, Quarter-Master Murray, and the Adjutant, who had had it in the West Indies, and all escaped it at Gibraltar, when every other officer in the regiment was attacked by it.

This same regiment, with five of the above named West India officers, and ten who had had it at Gibraltar, embarked for the West Indies in 1808, where they all escaped the disease, although eight of the newly appointed officers fell victims to it.

In the 54th Regiment, all the officers were attacked by it, excepting Colonel Derby, Captain Lowis, and Surgeon V. Dwyre, who had had it in the West Indies.

This regiment, in 1808, returned to the West Indies from Europe, filled up with new officers and men; and, after being 18 months in Jamaica, was attacked by and suffered severely from this disease, when all those who had had it at Gibraltar escaped it.—*Vide my Observations upon Bulam Fever, Mr. Redmond's letter, page* 73.

In the corps of Royal Barrack Artificers, every officer and man was attacked by the disease, excepting Sergeant Jones, who had had it in the West Indies.

In the regiment of Rolle, there was only one officer, viz. Lieutenant Muller, who had had it in the West Indies, and he was the only officer in the corps who escaped it.

The medical men at Gibraltar, during the first ten weeks of the disease, were 24 in number. Six of them had had it in the West Indies, and all escaped; the remaining 18 were attacked by it, of which number seven fell victims to it.

One more proof of the Bulam fever not attacking a second

time, was in the 70th Regiment, which suffered severely from the disease in the West Indies, in the year 1794. This regiment returned to that climate from Europe in the year 1800, filled up with new officers, with the exception of six, viz. Colonel Dunbar, Major Elliott, Captains Johnstone, Lawrence, Hutchinson, and Boat, who had had the fever at a former period, and who now escaped it, although the corps buried ten of the newly appointed officers in a very short time.

The 55th Regiment, quartered at St. Lucia, in the year 1796, was nearly annihilated by yellow-fever, when the skeleton of the regiment returned to England. There it was filled up with new officers and men; and, after being six years in Europe, arrived in Jamaica in the year 1802, where it again suffered severely from the same disease, having buried 21 officers. The surgeon of the regiment, Mr. Macmillan (now surgeon to the forces), says, it is worthy of remark, that every individual in the corps was attacked by this fever, excepting himself and ten of the officers, who had had it in the year 1796.

Upon a moderate computation, there were 150 officers at Gibraltar who had not had the disease before, and 25 who had passed it in the West Indies; and, making allowance for one or two doubtful cases, where the disease was so mild as not to confine the patient to bed, 145 at least out of the 150 were attacked by it, while every individual of the 25 who had had it before, escaped it;—proof positive that the Gibraltar, West India, or Bulam fever, are the same disease, and that the human frame is not liable to be attacked by it a second time, even after a lapse of ten years.

The 13th and 54th Regiments are proofs that persons who had it in Gibraltar are not liable to it in the West Indies. I have given numerous proofs that persons who had it in the West Indies were not liable to it at Gibraltar. And the 13th, 55th, and 70th Regiments, prove that persons who had it in the West Indies are not liable to a second attack upon their return to that country, afte having been several years in Europe.

I am truly surprised that its peculiarity of attacking the human frame but once, has not been sooner known; and now, that it is mentioned, that it has not excited greater attention. Lining mentions it particularly, in the Edinburgh Medical Essays, 50 years ago. In Sauvages' last editions, about 1768, it is positively mentioned. The English have long known the fact under the name of *seasoning*, and the French of *tribut, climaté, or une idiosyncrasie réfractaire à la contagion.* Monsieur Berthe, in mentioning the disease at Cadiz, says, "Le petit nombre de ces individus *ainsi privilégiés* a été observé parmi ceux qui avaient habité les Antilles." The emigrants from St. Domingo were proof against the contagion of Philadelphia in 1793—4. But vaccination was long known in Gloucestershire to the dairy-men before Dr. Jenner's discovery; and, with respect to my discovery in the yellow-fever, I cannot give it up to the Spanish practitioners. I made the discovery that the West Indians were proof against it on the 20th *October*, 1804, or rather the 19th, for that was the day that I requested Sir Thomas Trigge (governor) to order the men who had been in the West Indies to be paraded.

The first Spanish physician that mentioned it was Arejula, and he did not publish until 1806. Sir J. Fellowes gives the credit of it to the Spanish physicians generally. No individual one has claimed it. It certainly was not known among them in 1803; nor do I believe it was ascertained in 1804, until after the time that I discovered the non-liability of the West Indians, when I requested my friends in Gibraltar to write to Malaga and Cadiz, where inquiry was made, and the fact proved.

London, 6th January, 1816.

Case of Artificial Pupil. By Mr. Moore, Surgeon, Belfast.

[From the Edinburgh Medical and Surgical Journal, for April, 1816.]

Hugh Quin, a labouring man, aged about 48, applied to me in April last. When a boy, he lost the sight of the left eye by an accident. In September, 1814, he struck the sound eye against the end of a stick, and ruptured the sclerotic coat above the cornea, to the extent of half an inch, in nearly a semi-circular direction, with the concave part towards the cornea. A portion of the vitreous humour protruded, supported by its capsule and the flap made by the wound, and formed a tumour about half the size of a common bean. The eye was very much inflamed; there was a considerable discharge of matter like pus and mucus mixed; and severe pain in the temples and forehead, occasionally shooting to the vertex. The pupil was closed in consequence of the continued inflammation, which had now lasted eight months, and the iris had that rugose appearance we often see in closed pupil, and was drawn upwards by its attachment to the ciliary ligament, which ligament was drawn upwards by the protrusion of part of the vitreous humour. He could just discern light from darkness, at the clear light of a window or door.

On examining the eye, the following indications obviously presented themselves: 1st, To abate the inflammation in the eye, and relieve the pain in the forehead and temples. 2d, To remove or lessen the size of the tumour, as the friction of the upper eye-lid on it caused a considerable degree of irritation. 3d, To procure admission for light into the eye by an operation.

In order to fulfil the first, two grains of submurias hydrargyri were given at bed-time, and a drachm of pulv. jalap. comp. next morning. These were repeated twice a-week; and a solution of acetate of lead was very frequently applied to the eye by means of linen rags dipped in a large basinful of it. By continuing this plan a fortnight the inflammation was

nearly removed, and the pain in the head and temples quite gone.

Then, wishing to remove the tumour, I punctured it with the cataract-needle, and squeezed out the greater part of its contents, which were of the consistence of jelly, and appeared to be the vitreous humour thickened. In a few days a little inflammation, that had been excited by pressing it, abated.

I then proceeded to the operation, in presence of Surgeon Macdonnel of this town, and assisted by Staff-Surgeon Latham. Having fixed the eye with a speculum, I pierced the cornea with the extracting knife, half a line from the sclerotica on the outside, and a little above the transverse diameter of the cornea, and continued the incision to its lower part, keeping at the same distance from the sclerotica. I then introduced a very small hook, and fixed it in the centre of the iris, carefully avoiding the lens; the iris being gently raised, the point of a fine pair of scissors was introduced behind the hook, and the raised part snipped off and brought out. There was a slight effusion of blood from the iris, which rendered the eye turbid. The antiphlogistic plan was continued, as above mentioned, and in about a week the effusion was absorbed, and the eye became clear. We then found the pupil in its proper place, and fully the natural size; such as it usually is in a moderate light, and quite circular, except the part near the external angle, towards which it was lengthened a very little, and the margin of that part not so smooth or well defined as the other part of the circumference. He could now discern colours, point out the different objects in a room, and the panes of a window, or the colour of people's clothes at the opposite side of the street. In a few days he went home to the country with a very useful degree of vision. It is now five months since the operation, and I have lately heard from him. He is able to follow his business as usual, and the sight of the eye is as good as before the accident, except that the pupil has not the power of contracting, and it is necessary to wear a shade over it in a strong light.

As this affection of the eye has not been much attended to, it may not be irrelevant to give a slight sketch of the different

methods that have been practised for its relief, with a few remarks.

It appears that Cheselden was the first to perform the operation; and from his manner of doing it, he must only have considered that closure of the pupil which succeeds extraction or depression. He introduced a couching-needle, having a cutting edge only on one side, through the sclerotic, a line and a half from the cornea; and, pushing the needle through the iris near the external angle into the anterior chamber, and carrying it nearly as far as that side of the iris next the nose, he then turned the edge backwards, and withdrew it, so as to make a transverse section of the iris.

This operation has not succeeded in the hands of other surgeons; and it is evidently not adapted for a case of closed pupil where the lens is in its place, as it must be injured by introducing the needle into the posterior chamber. Besides, the incision of the iris is apt to unite again, and render the operation useless.

The method proposed by Janin, by making an incision the same as in extraction, and, with a fine pair of scissors, making a perpendicular division of that part of the iris next the nose, is better than Cheselden's, but I think is liable to two objections. The incision in the cornea is too large; one half the size or a little more is sufficient; and by carrying the incision farther than the lower part of the cornea, the flap is apt to be elevated by the lower eyelid, and prevented from adhering, and part of the iris is apt to protrude. The other is, cutting the iris perpendicularly on the part next the nose. In this way it will admit a portion of light, but the sight would be more extensive and better if it were in the proper axis of vision.

Scarpa has recommended to separate the iris from the ciliary ligament, by introducing a needle through the sclerotic, two lines from the cornea, and tearing the iris from the ciliary ligament, at the part next the nose.

He has practised this method in a few instances successfully; but that eminent surgeon only takes into consideration the case of closed pupil after extraction, or depression, or where the lens has been absorbed by solution. He informs us,

that there is great pain attending it; and also that it was a month and sometimes more before the blood effused in the aqueous humour has been absorbed. He has a great objection to cut the cornea after extraction, or depression; thinking that it will excite great irritation. The pain and irritation, however, is much less in opening the cornea, and cutting the iris in its centre, than piercing the sclerotica and tearing the iris from the ciliary ligament. Besides, the pupil is not in its proper place, where we ought always to endeavour to make it; unless there is some particular objection, such as an opacity of the cornea; and in that case we are obliged to make it opposite to whatever part may be transparent.

The late Mr. Gibson of Manchester punctured the cornea, so that part of the iris might protrude, and with a fine pair of scissors snipped off the protruded part, so as to form a pupil. This is a safe method, and is adapted for those cases where there is but part of the cornea clear, and the natural pupil sound, but obscured by the opacity. In puncturing, or making an incision in the cornea, it requires one of a considerable size to permit the iris to protrude; and when the pupil is made in that manner, it is behind the scar (or very nearly so) left by the incision, which may cause some obscurity in the sight; and I think it probable, that the iris and cornea may adhere, as we sometimes see after extraction.

Sir William Adams practises a method different from either of the foregoing. He introduces a small knife with one cutting edge only, and makes a transverse incision in the centre of the iris of a proper size for a pupil, and at the same time cuts up the lens, (as it must be wounded in making the pupil) in order that it may be dissolved in the aqueous humour, and absorbed. The patient may obtain a tolerable degree of sight no doubt; but it must be still imperfect, owing to the loss of the lens; and it may be sometimes necessary to break down the lens repeatedly before the solution is completed. Where I have seen it performed, there was a considerable degree of inflammation, and the cure was very tedious. Probably we may not always be able to save the lens; but I am

induced to believe, that most surgeons would attempt it, and that there is a reasonable prospect of success.

In performing the operation as described in the case related above, the only risk is, that of injuring the lens with the hook, when raising the iris to snip it with the scissors; but in the hands of a surgeon of tolerable steadiness, and accustomed to operate on the eye, there is very little danger. The hook I used is every fine, the curved part not being more than two lines, or two and a half in extent, and sufficiently curved to keep its hold until the piece was cut out. Raising the iris is of the greatest service, as it enables us to cut out a piece nearly circular; which makes a good pupil, and prevents it from adhering again, which it generally does, if there is only an incision made in it. The scissors used are somewhat concave, such as are used in cutting a piece of skin from the external part of the eyelid, in cases of inversion; and, I think, they make the pupil more circular than straight ones would.

From the foregoing, it appears that we may divide the cases that require the operation for artificial pupil into three species.

1st, Where the pupil has closed in consequence of the removal of the lens by an operation.

2d, Where the pupil has closed in consequence of inflammation from an accident, or some other cause, and where the lens is in its natural place.

3d, Where there is an opacity of the cornea before the natural pupil, that prevents vision, and there is some other part of the cornea clear.

In the first, either the operation practised by Scarpa, or the one described in the preceding case, may be adopted at the option of the surgeon. I have stated some reasons above for preferring the latter.

In the second, the operation used by Sir William Adams, or the one described in the foregoing case, may be adopted. I have also stated some reasons in favour of the last.

In the third, it is obvious we must make the pupil opposite whatever part of the cornea may be clear.

SELECTED REVIEWS.

The History of the Small-Pox. By JAMES MOORE, Member of the Royal College of Surgeons in London, Surgeon of the Second Regiment of Life-Guards, and Director of the National Vaccine Establishment. 8vo. pp. 312. Longman and Co. London, 1815.

[From the Edinburgh Medical and Surgical Journal, for January, 1816.]

THIS is a curious and a very amusing volume;—a sort of commendation, by the way, which we have not often occasion to bestow upon the subjects of our critical examination in this Journal. Mirth and medicine, indeed, are not very necessarily combined; but the author would have degenerated, and been unworthy his name and parentage, if he had given us nothing, in such a history, but a sombre detail of pestilence and physic. His little work, (little in point of size, but not in point of labour,) bears internal evidence of extensive and varied research, in the minute details of medical biography, and the curious historical anecdotes, with which it abounds; and which are pointed by not a little shrewd criticism, medical, moral, and political, and by a considerable portion of satirical humour. The work is dedicated to Dr. Jenner, and is said to have been composed, together with a history of cow-pox, hereafter to appear, with the view of aiding that enlightened benefactor of mankind in the extermination of the variolous pestilence, by convincing the public of the baneful effects of the one and the benign influence of the other, by thus contrasting their portraits. The opposition which vaccination has experienced renders such aid, he avers, necessary; "for," as he quaintly expresses it, "among the practitioners of the healing arts, Hygeia found enemies; and Disease and Death, friends."

In the first chapter, he treats briefly of "various opinions on the origin of the small-pox," and settles very expeditiously the question of the existence of the disease in the time of the Greeks and Romans, which he determines in the negative; principally upon the score of the accuracy of those writers in describing diseases with which we are still familiar, and of the impossibility of supposing them capable of overlooking the striking characteristics of small-pox, which were so minutely described by far inferior writers, the Arabians. We shall not set up any formal defence of the opposite doctrine, in favour of which, however, we think there are many circumstances of considerable weight, and we should have been glad if the author had not presumed upon the refutation by other writers, but had attempted to satisfy us himself. With all due veneration for the ancients, at least of that small number who were original observers, we think those sweeping assertions of their unvarying accuracy in the diagnosis of diseases, which preclude all idea of their having seen a formidable disease, without distinguishing it from all similar maladies, are the effusions of pedantry, and not justified by actual observation, or by the history of medicine. Have not these writers generally classed all violent and fatal diseases under the term *pestilential?* Have they any where given any thing like such an account of the common plague, as an ordinary ship's-surgeon would now give us from the Mediterranean? It appears, indeed, that they were generally too much afraid of encountering pestilence, to be able to give us very accurate histories of the symptoms, and too often fled from the cities where it prevailed. They were also blinded long before the time of Galen, by their hypotheses of the humours, and were content to determine whether an ulceration or eruption was the discharge of a bilious or phlegmatic humour, without attending to the history of symptoms. We must acknowledge, that the chapter which Aëtius has preserved from the works of Herodotus, a Roman physician (which are unfortunately lost), appears to us a body of positive evidence, which strongly opposes all such negative evidence, as the mere silence of other writers from Galen to Actuarius. Mr. Moore notices this sin-

gular chapter very slightly, by naming it only in the margin: we think it merited more of his attention; and that it is impossible to settle the question without a thorough explanation of it. There is no where, perhaps, a more distinct statement of nettle-rash,—of the little herpetic eruption about the mouth and alæ nasi at the decline of slight fevers,—of the *petechiæ* in fevers of a more typhoid character, "à pravis humoribus," —and of the ulceration and carbuncles of "*malignant* and *pestilential*" fevers, than in this chapter; and at the same time the symptoms of small-pox appear to be mentioned with no small accuracy, and many of the prognostics and diagnostics pointed out.* What other eruptions, "the most malignant when ulcerating the face, and when most numerous rather than when few, &c." accompany pestilential fevers, save small-pox? But yet so much under the influence of prevailing hypotheses was this discriminating writer, that he considers all these eruptions only as "signs of an abundance of corrupt humour, corroding the body." It is some impeachment of the accuracy of the other Greek writers at Rome, after Herodotus, that they have omitted to describe distinctly these eruptive fevers, with which he was obviously familiar. There is some reason for supposing that the great pestilence at Athens, the effects of which have been so well described by Thucydides, was small-pox. It was obviously not *the plague;* (for neither buboes nor carbuncles are mentioned;) but a disease in which the skin was extensively affected, being "red or livid, with *an eruption of small pustules and ulcerations.*"† It might, indeed, have been that epidemic, of which we happily know little in modern times, and which was the frequent result of famine, so admirably described by Lucretius under the appellation of "Ignis sacer."‡ But the very obscurity of these accounts is a proof, that neither physicians nor philosophers were very accurate in their discrimination of the various species of pestilential fevers, all of which they deemed but mo-

* See Aëtius, Tetrab. II. Serm. I. Cap. 129.

† Φλυκταίναις μικραῖς καὶ ἕλκεσιν ἐξανθήκας. Thucyd. Lib. VI. § 49.

‡ Lib. VI.

difications of the same thing; and it renders every inference from their silence on any particular pestilence nugatory.

Having settled the dispute respecting the ancients, Mr. Moore refutes very satisfactorily the statement of Dr. Paulet respecting an epidemic in France in 580, of which Queen Anstrigild, wife of Guntram, king of Burgundy, and the two sons of Childeric and "the dreadful Fredegonde," died. This was called *variola*, and affords the first instance, he says, of the use of this word. But upon the authority of Gregory of Tours, and of the Herman chronicle, Mr. Moore shews that this epidemic was the common plague, conjoined with dysentery. The story of the princess Fredegonde has nothing to do with the author's history, but it is too good a story not to be told, as it would have produced from Shakspeare, "a drama, equal to that of Lady Macbeth;" and it occupies three or four pages in Latin and English, and affords scope for one or two satirical squibs. His next source of authority was that ponderous collection of lies and absurdity, the Lives of the Saints, compiled in about forty folio volumes, (which constitute but three-fourths of the intended work) by the Bollandists. As these lucubrations relate the proceedings of the early Christians, who were much concerned in attending the sick, it might be expected that they would afford some information respecting the prevalent diseases, at a period not much later than the era of Galen and his successors, or at least some centuries before that of the Arabians. We have heard, indeed, that the late Dr. Willan believed that he discovered in this work, some evidence of the existence of small-pox in the second and third centuries: but Mr. Moore does not appear to have found at least the word, *variola*, before the thirteenth century. He admits, however, that he did not labour much in the perusal of this ponderous work; and surely the non-occurrence of the term, by which this disease has been designated in modern times, is no proof whatever of the non-existence of the malady, which might have been described, among other severe maladies, before any specific name was assigned to it. But while he contends that there is no evidence of the prevalence of small-pox in Europe so early as the sixth century,

the author believes, that the opposite opinion, adopted by Meade, Dimsdale, and others, that it was not introduced till the return of the crusaders about the end of the eleventh or beginning of the twelfth century, is equally erroneous.

In Chapter II. he proceeds to trace the earliest accounts of the disease in Asia and Africa, whence it is commonly believed to have been imported to the western kingdoms; and begins with the records of China, one of the earliest inhabited countries in the world. For our knowledge of these, we are indebted to the Catholic missionaries, who, by their address and influence, gained access to these documents. Mr. Moore details some evidence from the works of the missionaries, extracted from authentic Chinese publications, from which it appears, that not only the small-pox, but even some modes of inoculation, were familiarly known at a very remote period, probably long before the commencement of the Christian era. At the end of the seventh century, it is mentioned familiarly as an epidemic, in the chronicles of Japan, among the ordinary incidents of the time. And in Hindostan, "according to the traditions of the Bramins, the small-pox is of immense antiquity. It has several names in the ancient Sanscrit language, and its very early existence in that country is proved by their sacred books, and by the mythology of Hindus." The author collects from M. Sonnerat the genealogy and attributes of the goddess who presided over the small-pox, and relates also another account of the same deity from Baldæus. The existence of this superstition, and of various idols, as well as the practice of inoculation among the Bramins from very ancient times, prove the antiquity of the disease in India: and from a collection of original Hindoo drawings, Mr. Moore has engraven a representation of a procession, exhibiting the actions and the attributes of this terrible goddess. These religious rites, Mr. Moore observes, are decisive proofs of the dread in which small-pox was held, when human power was deemed inadequate to resist the calamity; and travellers in later times have been struck with the dreadful alarm, which its occurrence excites in China, India, Tartary, &c. In the latter country and Thibet, it is deemed a plague, and the pa-

tients are not only left to chance, but shut up from all communication. These circumstances, and the want of free communication in those countries, are considered by Mr. Moore as affording an explanation of the non-extension of the disease to Persia and Greece, long before the time of Hippocrates; and he attempts to account for the non-importation of the infection by the armies of Darius and of Alexander, in their respective invasions of India, by the long time which elapsed in so distant a warfare, the numbers of men who perished, and the extent of the deserts which were recrossed, which would give time to purify the troops from infection. Something like the small-pox, indeed, seems to have occurred near the mouth of the Indus, before the embarkation of Nearchus, according to the account of Quintus Curtius; but it is probable, as the author suggests, that the sick would not survive the hardships which the army was obliged to endure. Mr. Moore then briefly traces the progress of ancient commerce with India, and shews that the length of the voyage, as well as of the overland journey, was too long to admit of a probable communication of small-pox, even after Hyppolus had shortened the course, by trusting to the western monsoon, and stretching across the Erithrean sea, without compass, from the mouth of the Arabian gulf to Musiris. Even this was a voyage of a year. But towards the close of the sixth century, the spirit of commerce spread among the Persians, who brought from India the commodities which were wanted in the west; for their vicinity to India gave them great advantages over the Egyptian merchants:

"But," the author adds, "it also augmented the danger of transporting the variolous contagion. Indeed, whatever attention might have been paid by the commanders of these merchant-vessels, it was impossible that this calamity should have been avoided much longer; and, as ships coming from India, both in their passage to the Persian gulf, and to the Red Sea, frequently touched at the Arabian ports, that country was peculiarly exposed, and there accordingly it was first observed." p. 45.

In Chapter III. then, we are informed how "the small-pox

appears in Arabia, and follows the track of the Saracens." In the year 569, the celebrated religious war, called the war of the Elephant, occurred; in which Mecca is related to have been preserved by a miraculous destruction of the invading army, by a flight of supernatural birds, which killed the Abyssinians by dropping small stones like peas upon their heads. Mr. Moore has adduced some documents, which tend to prove that the small-pox and measles first appeared in Arabia in that year, at the siege of Mecca, and that the two species of supernatural birds were but fabulous representations of these two diseases; a suggestion which was made by Mr. Bruce, after examining some Abyssinian records. The place and period of the origin of these diseases, was but too favourable to their dissemination. They were accordingly soon known at Alexandria, where the first treatise on the small-pox was written by Ahron, (according to the testimony of Rhases,) who lived there during the life of Mahomet. This enthusiast, it is well known, was born in the same year in which Mecca was besieged; and he and his successors contributed most fatally to the extension of pestilence, even to the shores of the Atlantic. This account accords with the researches of Dr. Woodville on the same subject. The latter considered the disease, indeed, to have been carried to Alexandria in 638 by the Arabians, and to have been altogether unknown there before the siege of that city. This he infers from the silence of Paul of Ægina, (who was a contemporary of Ahron at Alexandria,) respecting the small-pox, although this writer affirms that he had omitted no disease then known. Mr. Moore attempts to explain this, by supposing that the work of Paul had been written before his settlement at Alexandria; which he thinks is probable, from its being little more than a compendium of Galen and Oribasius, and from this author being placed by Hali Abbas as the last of the ancients, while Ahron is called the first of the moderns; the epoch of the Hegyra, A. D. 622, being assumed by Hali as the boundary. May not his Greek education have somewhat warped his observation, and induced him to confound the disease with other pestilential maladies? It would seem, as Dr. Woodville

remarks, that Ahron did not describe the small-pox as a *new* disease, since Rhases strenuously contends that the disease was known to Galen, and he was perfectly familiar with Ahron's works.

At all events the small-pox, which was first distinctly described by the Arabian physicians, henceforth became the subject of much attention among that restless people, and attacked even their monarchs; for three of the early Caliphs were described as pitted with the small-pox, and one fell a victim to the disease. Many of the Arabians, in the periods subsequent to the Hegyra, wrote at length upon the small-pox and measles, which they carried, in the course of their conquests, not only through Persia, Syria, and Egypt, but eastward along the African coast of the Mediterranean, and ultimately into Europe. Mr. Moore concludes this chapter by some amusing anecdotes, well related, though not very novel, relating to the general history of medicine, rather than to that of small-pox.

In Chapter IV. he describes the "diffusion of small-pox through Europe and America," from the beginning of the eighth down to the eighteenth century. He informs us, in his waggish way, that the introduction of this pestilence, as well as the downfal of the Gothic monarchy, in Spain, was "owing to a rape committed by a king, and to the vengeance of a beautiful woman;" which he illustrates by giving a laconic sketch of the invasion of the Moors, in 710, who established the Koran and the small-pox in that country. From the sterile chronicles of the monks, the only historians of those dark times, little direct evidence, however, is to be obtained of the actual progress of this disease. Military and religious events chiefly occupied their attention, and almost the only disease, which they mention, is *the plague*. But the author here justly observes, that "that word had however a much more extensive signification, than it has since; and was applied *then* to *every dangerous epidemic:*" He adds, in the next page, "but it is quite certain that the small-pox was in those days included among the pestilences. For in the first translations of the work of Rhases, the small-pox is termed *Pestis;* and Constantinus Africanus, as well as many of the early medical writers,

class it with pestilential fevers." And again, "the small-pox being included in the term pestilence, explains satisfactorily why it is not named by the older writers; and also accounts for the very frequent occurrence of the plague in early times." He is hence convinced that some of the epidemics, called the plague, which is said to have visited France eleven times in the ninth, and six or seven times in the tenth century, "were unquestionably the small-pox and measles;" and he is likewise of opinion that the pestilence of the *holy fire*, so terrible and fatal, and so often epidemic, must have been in many instances small-pox or measles.

That this was really the case, there is very little reason to doubt. But surely the same inference is applicable to the more ancient, as to these later periods of time. And if physicians, late in the eleventh century, when the Arabian learning was well known, and especially if such a physician as Constantine, deeply versed in oriental literature, and who had in fact spent thirty years at Bagdad and Babylon, before he settled at Salernum, in the very cradle of the small-pox (according to this doctrine), should still persist in classing this remarkable disease with the plague, ignis sacer, scarlet-fever, &c. under the common appellation of pestilence;—is it surprising, that the earlier physicians, to whom the distinction had not been made manifest, and who have done little more than echo the doctrines of Galen, or that that voluminous theorist himself, who was blinded by his bile and phlegm, should confound them altogether? We know well with what difficulty the human mind throws off the trammels of habit and early instruction. It is scarcely more than a century since the measles and small-pox were allowed to be distinct diseases, and not so long since the chicken-pox was distinguished from the latter; and half a century has not elapsed since the scarlet-fever and malignant sore throat were identified, and since this fever was denominated "putrid measles."—It seems just as probable that the pestilences of Thucydides and Lucretius were small-pox, as any of those epidemics of the ninth and tenth centuries, to which the author has alluded. It is probable, however, that the *holy fire* was a distinct epidemic, differing from small-pox and ery-

sipelas, and resulting from famine, and therefore less common in our times; but it appears to have occurred at a later period, in different parts of the Continent, where it has commonly been ascribed, not to want of nourishment, but to depraved and noxious food, and has received different appellations accordingly. Thus in France, it was called *Ergot*, being attributed to diseased rye; in Sweden, *Raphania*, from its supposed origin from eating the Raphanus; and in Germany, *der kriebel Krankheit*. It seems to be a modification of scurvy, and terminates in a dry gangrene.

Believing the small-pox to have been born with Mahomet, at Mecca, in the year 638 or 640, or at least to have first appeared at that time in the west, Mr. Moore has some difficulty in crediting an account, which Dr. O'Conner has quoted from some ancient annals of Ulster; namely, that in 679 the small-pox, (which is called *Bolgach*) was epidemic in Ireland, and again in the early part of the following (eighth) century; a circumstance which is not easily reconciled with the notion that the Moors were the carriers of the disease into Europe above 30 years afterwards. In England, Dr. Short asserts that in 907, the Princess Elfrida, probably a daughter of Alfred, was ill of the small-pox, but recovered; and in 961, Prince Baldwin, of Flanders, her grandson, died of a disease, according to the Bertinian Chronicle, "which physicians called *variola* or *pocca*." This Mr. Moore believes to be the earliest authentic use of these words. And he thinks it "*rather odd*, that the earliest cases of small-pox in Europe, should be those of a British princess and a Flemish prince; as before that disease had reached Flanders, it must have traversed all the intermediate countries from the Mediterranean, and it must have existed some time in the north, before it acquired a Saxon name." (p. 90.) This concluding remark proves that no such oddity here existed; the diseases of princes are likely to be the first that are recorded by historians; but the very fact that the contagion had reached these royal courts, demonstrates, not less satisfactorily than the use of a vernacular name, the previous extensive prevalence of the disease among the people.

This chapter is concluded by some curious medical and historical anecdotes, collected from the saints, and by some statements in refutation of the assertions of Dr. Mead, Baron Dimsdale, and others, that the small-pox was brought into Europe by the returning crusaders; since, in fact, it reached Europe two centuries before the return from these frantic expeditions. In the thirteenth and fourteenth centuries, Mr. Moore finds the disease mentioned in the Lives of the Saints, as well as the blindness produced by it, the curing of which is often stated among the miracles which they performed. And he concludes by observing, that, as in all human affairs good and evil are intermingled, so the invention of the compass, and the discoveries of Columbus, occasioned scenes of misery that never were surpassed; and, among others, the extension of small-pox and measles to another hemisphere. He traces them to St. Domingo in 1517, to Cuba in 1520, and afterwards to Mexico, where in a very short time they destroyed three millions and a half of people. In Iceland and Greenland, the diseases have appeared more lately, but scarcely less fatally. He then sums up these results of his inquiries.

"It may be concluded, from the foregoing historical sketch, that the small-pox and measles had prevailed in China and Hindoostan from remote antiquity, probably upwards of three thousand years; yet had not extended to the more western nations until the middle of the sixth century. About this latter period the above maladies reached the southern coast of Arabia, by vessels trading with India, and broke out near Mecca, during the war of the Elephant, in the year 569, immediately before the birth of Mahomet.

"During the latter part of the sixth, and the whole of the seventh centuries, they were spread, by the Arabians, over the remaining countries of Asia, and all that part of Africa which is washed by the Mediterranean sea. In the eighth century Europe was contaminated, in consequence of the Saracens invading Spain, Sicily, Italy, and France; and the above diseases gradually extended to the north. They had certainly reached Saxony, Switzerland, and England in the tenth, and probably in the ninth centuries. And lastly, in the beginning

of the sixteenth century, twelve years after the death of Columbus, the infections were transported by the Spaniards to Hispaniola, and soon after to Mexico, and diffused speedily over that hemisphere also." p. 110.

In Chapter V. Mr. Moore details, with considerable erudition, "the various theories and treatment of the small-pox from its appearance in Arabia, to the fifteenth century," beginning with Ahron, who wrote subsequently to the epoch of the Hegyra, (622), but whose works are lost, except some fragments preserved by Rhazes, and ending with Arnold of Villanova, Gilbertus Anglicus, and John of Gaddesden. The author appears to have examined the works of all these authors with great industry, and he has detailed the principal doctrines and methods of treatment, which they have respectively adopted with respect to the small-pox, as well as the leading circumstances of their lives and characters; so that this chapter is a neat but comprehensive compendium of the medical history of Arabia, and is enlivened by many judicious remarks on the peculiar merits and imperfections of these writers, as well as by various anecdotes not immediately connected with the small-pox. The minute and amusing account of Arnoldus de Villanova evinces, among others, the zeal and success with which Mr. Moore has sifted the writings of these ancient authors. The most curious parts of the voluminous works of this writer, as well as the works of John of Gaddesden, are those which relate to the various subjects on which they appear to have been consulted by both sexes, relative to the improvement of their mutual attractions. Arnold treated of sorcery, too, as of a malady in the physician's province; and describes many witcheries, and the potent spells by which they may be overcome. The terror of cold, which was strongly inculcated by the first writer on small-pox, Ahron, upon hypothetical principles, was not less carefully inculcated by all subsequent writers down to Sydenham; and John of Gaddesden and his contemporaries ascribed much efficacy to every thing *scarlet*, probably from its fiery hue.

Chapter VI. is headed, "From the fifteenth to the middle of the seventeenth century. Fire, philosophy, and the alexi-

pharmic treatment." The author has here shewn the same able discrimination of character, in his biographical sketches of the writers, whose doctrines he briefly describes, and characterizes by some pointed quotation or appropriate anecdote, as well as the same intimate acquaintance with their works. Fracastorius, Paracelsus, Fernel, Forestus, Mercurialis, Sennertus, Van Helmont, Willis, Riverius, Diemerbroek, Kircher, Sylvius, and some others, are thus passed in review, with an account of their opinions and practice in respect to the small-pox.

In the VII. Chapter, the author treats of "the cold treatment.—Sydenham, Boerhaave." Between these two luminaries of medical science, he has also given brief accounts of the opinions of Etmuller and Doldus. His biographical sketch of Sydenham is short, but his detail of the particular improvements in the treatment of small-pox, which Sydenham introduced, is very copious, and he justly laments the hypothetical error, of bleeding in the last stages of confluent small-pox, into which that able physician fell. Boerhaave admitted that the history of small-pox and measles, which Sydenham left, could not be improved; but from his general reasonings on febrile diseases, he had the merit of introducing two essential improvements on the practice of that author, the exhibition of aperients in the beginning, and changing the antiphlogistic for a cordial regimen towards the conclusion of the confluent small-pox.

In the three following chapters, the author has given an animated account of the discovery and progress of inoculation, from the Chinese custom of *sowing* the small-pox, down to the improvements made by the Suttons, Dimsdale, and others; together with a detail of the controversies which it excited, and of the various publications, religious and medical, to which it gave rise in this country. And in the eleventh, and last, chapter, he treats of the opinions of Dr. Cullen, and of the final treatment in which physicians at length terminated their dissensions. Mr. Moore then inquires into the result of the labours of twelve centuries to remedy this malady; and confesses that the view is rather mortifying to a medical phi-

losopher. The immense general mortality, however, he justly remarks, is not disgraceful to the art of medicine; because in individual cases the fatality of the disease has been much diminished by the improvements in practice, and especially by inoculation, and indeed in no disease perhaps has the salutary influence of medicine been more conspicuous. For in countries where ignorance of the disease prevailed, the small-pox has proved a most fatal pestilence; but here, a very large proportion of the community, who submitted to professional instruction, have escaped all the calamities incident to the disease. The mischief has arisen principally from the difficulty of inducing all persons to resort to inoculation; and under that impossibility, it has been increased from the want of some laws of exclusion, analogous to those of quarantine, by which those, who produce the disease by inoculation, should be prevented from exposing the inoculated persons in the way of those who are liable to the infection. A recent decision in the Court of King's Bench, however, has shown, that such an exposure, where it produces the disease in others, is a misdemeanour by common law, and a medical practitioner, and an ignorant mother, have recently been subjected to imprisonment for being guilty of this act. We submit to the most severe laws of quarantine, for the sake of evading the introduction of foreign contagion, (laws which allow any individual to take the life of a person seen in the act of breaking them) and there seems no sound reason why we should not guard against the wilful propagation of domestic contagion, by a law which should preclude all persons infected with the small-pox from mixing with the public.

"Some opposition," says the author, in his concluding paragraph, "might be expected from those who live by spreading contagion among the community. But there are a set of men whose immoral conduct merits rather the castigation of the magistrate, than the consideration of the legislature. And few even of them would have the effrontery to raise objections to a statute for extinguishing the most fatal pestilence that ever preyed upon man; which, like the benign law for abolishing the slave-trade, would reflect lustre on the mover, adorn the

annals of parliament, and add grace to the sovereign; and would likewise form (though it may spoil the climax) the most agreeable conclusion possible to the eventful History of the Small-Pox."

The foregoing sketch of the contents of this work will afford some idea of the very complete view, which the industry and ability of the author have enabled him to present, of the evidence which is extant respecting the progress and treatment of the small-pox; but it will afford no adequate impression of the various collateral information, connected with medical history, with which it abounds, and of the sprightliness of the manner in which it is detailed, both of which contribute to extend its interest beyond that of the medical reader.

Reports of the Pestilential Disorder of Andalusia, which appeared at Cadiz in the Years 1800, 1804, 1810, *and* 1813; *with a detailed Account of that fatal Epidemic, as it prevailed at Gibraltar during the Autumnal Months of* 1804; *also Observations on the Remitting and Intermitting Fever, made in the Military Hospitals at Colchester, after the Return of the Troops from the Expedition to Zealand in* 1809. By Sir James Fellowes, M. D. &c. &c. pp. 484. London, 1815. Longman and Co.

[From the Edinburgh Medical and Surgical Journal, for January, 1816.]

This work comes from the very highest authority, not only on account of the professional rank of the author, but much more on account of the zeal with which he availed himself of his opportunities of examining minutely the subject on which he writes. Sir James Fellowes has divided his book into five Reports. The first relates to the fever which prevailed in Cadiz in 1800; the second to that of Gibraltar and Malaga in 1804; the third to the fever of Cadiz in 1810; the fourth to that of 1813 in the same city; and the fifth Report relates to

the Walcheren fever, as it appeared in Colchester in 1809. To these are added a Conclusion, and eight Appendices.

Sir James Fellowes had been with Admiral Christian in the West Indies, and had had only too many opportunities of witnessing the pestilential fever which committed such ravages among our soldiers in St. Domingo. He is therefore good authority, when he describes the peninsular fever as "appearing under a similar form of malignity, and showing many of the strongly marked characters of the St. Domingo fever." Upon this point, and indeed upon almost every point, Sir James entertains opinions nearly similar to those of Mr. Pym, and, like him, strongly combats the account which Dr. Bancroft has given of the origin and mode of propagation of these diseases. Indeed, it is impossible to deny the contagious nature, at least of the peninsular fever, after having perused the documents collected by Sir James Fellowes. Whether he has been successful or not in tracing the introduction of the fever into particular places, we shall not stop to inquire. However satisfactory the proof of such a fact might be, it is almost impossible to ascertain it, so as not to admit of explanation in controversy; and, in disputing about circumstances of very secondary importance, we lose sight of the much more conclusive evidence derived from an extended view of the whole. Although we have so lately expressed our sentiments on the subject, we cannot refrain from confirming them by some general arguments derived from the perusal of the instructive volume before us.

The first is the total disproportion between the increased number of deaths, and any supposable increase of any alleged endemic cause. Even if it were ascertained that the weather in these destructive years was somewhat hotter or colder, or drier or moister than usual, we should only expect the endemic diseases to be proportionally more severe and more numerous than usual; at the most we should expect a very unhealthy year; but the change in the peninsular diseases was not in degree, it was in character. It was not merely that a much greater number of people were attacked, and that of these a much larger proportion died, but we find that, in these

pestilential years, few escaped, and of those attacked the mortality was excessive. In Cadiz, in 1800, the population was 57,500; 48,520 were attacked, and 7387 died, while the average deaths in a year did not exceed 2616; in Seville the population was 70,488; 61,718 were attacked, and 16,685 died; and in Gibraltar in 1804, the garrison consisted of about 4000 men; in the monthly return for August there were 83 sick, in that for October there were 565. The average deaths among the military in a year were 72; during the Duke of Kent's command only 39 in two years; during the epidemic, in four months, 918 died, and 164 of their wives and children; while of 14,000 inhabitants only 28 escaped the disease, and 5028 died.

The next general argument is derived from the history of the various epidemics of this disease which have been observed in the peninsula. Its recent introduction, the distant periods at which it has appeared, the partial, and, if we may use the word, desultory, manner in which it has affected the peninsula, all militate strongly against its endemic origin. Before the commencement of the 18th century, Spain had been repeatedly visited by the plague derived from Barbary or the Levant, which confined its ravages to particular places, or extended them more widely, as more or less care was taken to prevent all intercourse with infected places.

In 1730, the disorder since known by the name of *El vomito negro*, or black vomit, first made its appearance in Cadiz, and destroyed

"Great numbers of persons, very few having escaped who were attacked by the disease. In the year following, it prevailed with equal fury, and spread general alarm throughout the country; two symptoms were particularly noted as being most fatal in this disorder, which had not been before observed in Spain; viz. spots of a livid, yellow, or dark colour, that covered the body, and were the certain forerunners of the black vomit: the physicians were of opinion, that the malady was of a pestilential nature, and they advised the magistrates to take the necessary precautions."

It was said to have been introduced by a vessel from Spanish

America, and that it spread to other parts of the peninsula. The year 1730 was remarkable for its drought, which was supposed to have caused the influenza then prevalent.

The *vomito negro* appeared for the first time in Malaga in 1741, and it was also said to have been introduced there by a vessel from South America. It carried off upwards of 10,000 persons. It again appeared in 1764, but was confined to Cadiz, nor even there was it very fatal or general. The preceding spring and summer had been remarkably dry. This epidemic has been briefly described by Dr. J. Lind, whose opinion was, "that the fever may be communicated by contagion, but that this contagion is very slight, unless co-operating with a bad air, and in a ship is often greatly checked, if not wholly destroyed, by going out into the open sea."

It again appeared in Cadiz about the beginning of August 1800, in the Barrio de Santa Maria. Although at first confined to this district, it continued daily to gain ground; but, on the 5th of August the people went in procession through the town to appease the supposed anger of the Deity, and in five days time, cases of fever were reported in the other Barrios. About the middle of September the deaths amounted to 200 daily. In October the mortality began to diminish, and on the 12th the city was declared to be healthy. Towards the end of August the neighbouring towns were not yet infected; but about that time it reached Isla de Leon, Port-Royal, Chiclana, Puerta de Santa Maria, St. Lucar, and Rota. It also committed dreadful ravages in Seville and Xeres, but did not extend beyond the Sierra Morena. During the years 1799 and 1800, the true plague almost depopulated the states of Barbary, which caused the Governor of Gibraltar to establish regulations and measures of precaution, for the safety of the garrison; which, in fact, remained perfectly healthy, with plague on the one side, and yellow fever on the other.

In 1801, the yellow fever appeared at Medina Sidonia, but soon ceased, and extended no farther.

Toward the end of August 1803, it broke out in Malaga, and carried off great numbers. It declined as usual in the month of December, but only to burst forth with increased vi-

rulence early in the summer of the following year; and, upon this occasion, it extended its ravages in every direction. The cities of Cordova, Granada, Velez Malaga, Carthagena, and Alicant, on the east-side of Spain; Antequera, Cadiz, and the towns on the west-side, as far as Ayamonte, were severally attacked. It also affected Leghorn, but no other part of Italy, and the lofty fortress of Penon de Velez on the north-west of Africa. At last our own fortress of Gibraltar was doomed to suffer severely, and the 28th of August 1804 is fixed upon as the day when the first case occurred. With the approach of the cold weather, it once more ceased all over Spain for some years.

In 1810, Cadiz was once more attacked, about the 11th of September; great mortality from the ship or jail fever having taken place in the early part of the year among the French prisoners of Dupont's army confined on board hulks. This year it was confined within the walls of Cadiz, on this side of the peninsula, and even spared the Isla de Leon, to which the British troops had been removed on the first intelligence of the disease having reappeared; but it prevailed at Carthagena, and slightly at Gibraltar; and about the 16th or 18th of October, in the distant island of Teneriffe, but did not extend to any other part of the Canaries.

The kingdom of Murcia continued to suffer in 1811, when the rest of Spain was healthy.

Early in September 1813, the last peninsular epidemic which we hope it will be our duty to record, began in Cadiz, from whence it spread to Port St. Mary's, and several other places, to which the emigrants from Cadiz retired. Gibraltar was also visited by it this season.

When we carefully consider this chronological notice of the epidemics of the peninsula, which it has cost us some trouble to extract from the publications of Sir James Fellowes and Mr. Pym, and trace their progress upon the map, connected with the local circumstances of the places, whether infected or healthy, it seems to us impossible to account for its progress upon any general principle of peculiarity of local circumstances, or atmospheric influence, independent of contagion.

The third general argument, and one perhaps still more conclusive, is derived from the effect of quarantine and seclusion, in preserving places or individuals from the disease when it was prevalent, and of separation of the sick in putting a stop to its further progress. Sir James Fellowes's Reports abound with the most striking proofs of this fact, and to them we must refer our readers. We shall only extract one or two.

When it prevailed in Murcia, in 1811, the French drew a cordon of troops around the infected district, and it did not extend beyond it. (p. 239.) In 1810 and 1813, when the French occupied Malaga, and had little communication with the surrounding country, Malaga remained healthy. Many cities, as Aguilar, (p. 195,) Xeres, (p. 291,) remained free from the disease, while it extended to others much more remote, where no precautions were taken. Even in infected towns, those who avoided communication with the diseased escaped, as exemplified in the case of the convicts in Cadiz, and of the workmen in the dock-yard at Gibraltar.

The last argument is the counterpart of the former, the numerous proofs of its being directly conveyed or communicated by personal intercourse, when no other circumstance seemed to favour its propagation. Of this it is sufficient to notice its appearance in 1804, in the fortress of Penon de Velez, on the northern shore of Barbary, distant in regard to situation, but receiving all its supplies from Malaga, while no other part of Barbary suffered from it. The instances in individuals adduced by Sir James are very numerous and striking.

We have entered much more at length than we intended into the proofs of the contagious nature of this disease, because we consider the establishment or refutation of that point to be of the very greatest practical importance.

Sir James also confirms, by many instances, the curious fact which we first learned from Mr. Pym, but which seems to have been observed very soon by the Spanish physicians, that this disease attacks persons but once in their life.

"Professor Arejula closes his observations with the following remark:

"The yellow-fever of Andalusia only attacks persons once

in their lives, and it is of great importance for the physician to know this, in order to form his prognostic and his plan of cure, as well as for the individual who may have passed through the disorder, that both of them, being assured of this fact, may step forward without fear to the relief of their fellow-creatures who may hereafter be afflicted with so dreadful a malady."

Sir James Fellowes has prefixed to the account of each epidemic, an excellent medical topography of the places where it prevailed; and, in the appendix, has given an account of the climate and weather, founded on the most accurate meteorological observations. For many valuable remarks on the nature and symptoms of the disease itself, especially as assisting us in forming our prognosis, on its pathological effects, and its method of treatment, we must refer to the work itself. Besides his personal experience, his work contains a great deal of useful information, derived from the best publications by the physicians of Spain, whose individual merits Sir James was well qualified to appreciate.

The fifth report contains

"Observations on the bilious, or autumnal remitting and intermitting fever (called the Walcheren fever), with remarks on the treatment of the disease, as it appeared in the military hospitals at Colchester in the months of September, October, November, and December, 1809."

It does not admit of analysis, but contains many excellent observations, of which we shall select a few. First, in regard to the prevention of the disease.

"On referring to the returns of the sick that came under his charge to England, Mr. Jones informed me that he observed one company of the right wing bore no proportion to the others, having only *one* man ill; and on enquiring into the cause of their exemption from disease, it was found, that, when the troops entered their cantonments, strict orders had been given to prevent their smoking in any of the barns, for the fear of accidents from fire.

"In consequence of this order, it was customary for the men in the evening, after they had thrown off their accoutre-

ments, and many of them part of their dress, to take their pipes and sit under the trees, or rest themselves in other open and exposed situations, where they enjoyed the conversation of their comrades, in some instances probably to a late hour; whilst the men belonging to the company alluded to, being quartered in rather a better description of house, were in the habit of smoking their pipes in a *large kitchen*, with the servants of the Dutch family; *here* they were *sheltered* from *the exhalations* so prejudicial to health in such climates and under such circumstances, when the constitution was more liable to be acted upon, viz. in a state of inactivity after fatigue or exercise." p. 343.

"The interesting observation communicated by the surgeon of the 43d, of the comparative healthy state of the company of the right wing over all the others in that regiment, is highly deserving of attention; more real advantage may be derived from the knowledge of a single fact, so stated, than from volumes written expressly on the subject of military diseases: it shews how much depends on the attention of commanding and medical officers of regiments to all the minutiæ connected with their interior economy.

"It was to be regretted that the troops were taken out to exercise before sun-rise. The danger of allowing the men to be *under arms every morning an hour before day-light*, does not appear to have been considered; and it is extraordinary, that after all that had been written upon the subject of preserving the health of soldiers in such unwholesome climates, no precautions seem to have been taken to *guard* against the fatal consequences of exposure to the damp and noxious exhalations." p. 345.

Next, in regard to the cure,

"From the appearances which were observed in these dissections, we were led to draw the following conclusions; that the original disorder was of an inflammatory nature, inducing a considerable vascular excitement and determination to particular organs, especially to the liver and spleen, and that the derangements in their functions occasioned those *relapses* or subsequent returns of fever which took place at distant pe-

riods and at lengthened intervals, from the original or primary attack.

"In fact, we found that no radical or perfect cure could be obtained until the congestions which had been formed in those important organs were either *lessened* or removed; and by keeping in view the connexion that subsists between the bilious remittents of warm climates, and the remitting and intermitting fevers of our own latitudes, in which derangements in the bilious secretions are so remarkable, a correspondent plan of cure was adopted, and was attended with the happiest result." p. 360.

"The general plan of treatment at first, was to open the body by means of five or six grains of the submuriate of mercury, with an equal quantity of c. ext. of colocynth, followed up by the senna infusion, and sulphate of magnesia, after which the submuriate and antimonial fluid were given every three or four hours in small doses, and continued, either with or without mercurial friction upon the side, according to the state of the patient and the period of the disorder, or until the mouth became *slightly* affected.

"The warm bath, fomentations, and blisters to the side were also employed, together with an anodyne draught, and occasionally the camphorated mixture, with acetate of ammonia, &c.

"In the *most obstinate cases*, it was found necessary to push the mercurial friction to some length, so as to induce ptyalism; and when there was appearance of remission, the *bark* was given, and *not till then*, in the form of decoction, with an aromatic; *wine* was also allowed in small quantities according to the strength of the patient.

"This was the usual method we followed throughout the month of September; but in October and November we had occasion sometimes to use the lancet; and in the cases of *relapse* particularly, the best effects seemed to follow the loss of blood.

"As we had reason to suspect that these attacks of fever were connected with abdominal inflammation, cupping-glasses were employed in preference; and after fomenting the parts,

they were applied either to the region of the stomach, liver, or spleen, where the pain was most complained of, and great relief invariably followed from this topical bleeding." p. 363.

"When Sydenham complained that he knew of no successful method of treating intermittents, as the *bark*, which had always had the appellation of a specific, rather checked their progress than removed the cause of the disease; those congestions were not suspected which have been shown to exist to a great degree in consequence of the strong determinations to the viscera, which very early take place; and it was not likely that the disorder could be radically cured, until the irritation which they occasion in the system was entirely removed.

"It is not however by *throwing in mercury, and pouring in the bark*, that this effect is to be produced; these are terms to be met with in some late writers, and they are not less improper than the indiscriminate and empirical manner in which those invaluable medicines have been employed.

"The smallest quantity of mercury will often (as it is well known) affect some constitutions so speedily, that it is impossible to lay down any rule for its administration in these fevers.

"I have generally found great advantage to result from its being introduced gradually into the habit, and its action to be rendered more certain by being given in small doses, and at distant intervals." p. 283.

"In the distribution of the extra diets, or what are termed *medical comforts*, a discretionary power was given to the medical officer in attendance; but one general principle was admitted by all, and acted upon throughout the establishment; that *wine* and *spirits* were not found to be *absolutely* necessary to the removal of the *Walcheren* fever, as it was called; and that, during the *progress of convalescence*, the management and *quantity of diet* was to be considered of the highest importance in effecting a perfect recovery. A very contrary opinion had long prevailed, and it is the popular one in the army, that the British soldier required more nourishment and more animal food than those of other countries, and hence arose the

profuse and liberal allowance of every article that could be thought of, which tended rather to satiate, than to satisfy the appetites of persons recovering from acute disease." p. 332.

On Gun-shot Wounds of the Extremities, requiring the different Operations of Amputation, with their After-treatment: establishing the Advantages of Amputation on the Field of Battle to the Delay usually recommended, &c. &c. &c. With Four explanatory Plates. By J. G. GUTHRIE, of the Royal College of Surgeons, London; Deputy Inspector of Military Hospitals. 8vo. pp. 384. Longman and Co. London, 1815.

[From the Edinburgh Medical and Surgical Journal, for April 1816.]

OF this book we may with truth say, "Indocti discant, et ament meminisse periti." The experienced and intelligent surgeon will have pleasure in acknowledging the interest with which he has perused it; but to the junior and less experienced members of the profession, and especially to the younger military surgeon, this treatise of Mr. Guthrie must prove an invaluable gift. A work of this kind was, in truth, wanted for their instruction; and the *desideratum* has been most happily supplied, not by an ordinary surgeon, but by one bred in the camp and in the field of battle. The reader, too, is introduced to this great school of military surgery, and becomes accustomed to its horrors, its dangers, and privations. But, amidst the difficulties and privations of active campaigns, it is delightful to observe with what order and precision the medical arrangements have been conducted during the dreadful war of the peninsula; and to learn that our brave troops had the advantage of being succoured by surgeons of first-rate talents and acquirements. Such, indeed, appears to have been the zeal and talents of the more experienced surgeons of the staff, that the camp and field were converted into schools for the

instruction and training of the younger medical officers, by all the aids of lectures and demonstrations. And, though we know that almost all the medical recruits who were sent out to the army had received what is called a regular and liberal medical education, and had not received their certificates or diploma till after a regular inquisitorial examination, though many had received even the highest honours of medicine, yet the lectures and demonstrations of the camp were necessary to make them actual surgeons, and they soon became excellent.

Military surgery, like military success and glory, is indeed of late date amongst us; and, to judge from the specimen before us, we think we have now no less reason to be proud of the one than of the other.

The practical conclusions of this interesting volume Mr. Guthrie disclaims as exclusively his own; and he wishes them to be considered, in every thing that is useful, as the result of the general experience of the British military surgeons who have served in the late campaigns.

One of the most important questions in the department of military surgery is that so often discussed, with regard to the proper period for amputating—whether, when such operations are necessary, they ought to be performed on the field of battle, immediately or soon after the injury received, or not till after the removal of the wounded into hospital or quarters, and when the first train of supervening accidents have been subdued.

The whole merits of this hitherto disputed point are most ably investigated by our author in his first section; but the question seems now finally determined, by the experience of military surgeons, in favour of early and immediate amputation, when the limb cannot otherwise be saved. Wiseman, Le Dran, and Ranby, who learned their surgery in the field of battle, are all advocates for immediate amputation; and, perhaps, with the exception of Bilguer, the opposite seems to have grown up with, and to have been defended, chiefly by men of

limited experience in military surgery. At the beginning of the wars which have for some time past desolated the fairest parts of Europe, both the Continental and the British surgeons rather inclined to the side of delay; but experience has now taught both the French and the British surgeons the advantages of operating on the field of battle.

The objections made to this appear to have been founded chiefly on theoretical grounds;—these are examined and refuted in a very luminous and satisfactory manner by Mr. Guthrie; but the argument drawn from actual, extensive, and general experience, is so paramount, as to render all other exposition of the merits of the question most unnecessary in this place.

At first sight, indeed, it is obvious that, if a man must lose a limb, he had better lose it immediately, than after three or four weeks of pain, and suffering, and fever, and inflammation, suppuration, gangrene, and danger. It is certain also, that, in this struggle, many would die before the period of his last chance for recovery by amputation could arrive; but even this period, when the patient has survived and attained it, is less favourable for the operation than the moment when the accident was received; and, of any equal numbers of operations performed, the one number on the field of battle, and the other at the secondary period, it appears in evidence, that a far greater proportion of the former recover than of the latter. As the most satisfying proof of this leading fact, we shall content ourselves with exhibiting the following tables from the book now before us:

"Return of the capital operations performed at the hospital stations, between the 21st of June and the 24th December, 1813, of the army under the command of his Excellency Field-Marshal the Duke of Wellington; being a period of six months, from the advance of the British army from Portugal, until its establishment in winter quarters in front of Bayonne.

	Number operated upon.	Of which died.	Discharged, cured.	Under cure.
Amputation of the upper extremities,	296	116	105	75
Lower extremities, ...	255	149	65	41
Total number of operations, ...	551	265	170	116

The operations at the shoulder-joint not included.

"Return of the capital operations performed in the same period on the field of battle, and for the most part kept in regimental and divisional hospitals.

	Number operated upon.	Of which died.	Discharged, cured.	Under cure.
Amputation of the upper extremities,	163	5	64	94
Lower extremities, ...	128	19	43	66
Total number of operations, ...	291	24	107	160

"The cases marked "under cure," in both statements, having passed the period of danger, are considered as recovered; and from this it will appear that the comparative loss, in the secondary or delayed operations, and primary or immediate operations, is as follows:

	Secondary.		Primary.
Upper extremities, ...	12	to	1
Lower extremities, ...	3	to	1

"This difference is certainly very remarkable, and it is so well known to all the surgeons of the British army, as a constant occurrence, that there is no longer among them any doubt on the subject; and the following statement of operations performed on officers and soldiers, in consequence of the battle of Toulouse, will probably be even more satisfactory; as the medical duties both in the field on the day of action, and in the hospitals afterwards, until the final evacuation of Toulouse, were more immediately under my observation and control.

"Primary Operations on the Field of Battle.

	Number operated upon.	Of which died.	Cured.
Upper extremities, ...	7	1	6
Lower extremities, ...	40	8	32
Total of primary amputations,	47	9	38

"Of the eight that died of amputation of the lower extremity, three were shortly after the operation; which was performed as high as possible in the thigh by the circular incision, and one officer.

"Secondary or delayed operations in General Hospital.

	Number operated upon.	Of which died.	Discharged cured, or considered out of danger when transferred from Toulouse.
Upper extremities, ...	15	3	12
Lower extremities, ...	36	18	18
Total of delayed, or secondary amputations,	51	21	30

The reasons of this difference of success are, that, in the primary operations, the amputations have been performed on a healthy subject, and on sound soft parts; and hence the

stump generally heals by the first intention, and without accidents. In the secondary amputations, on the contrary, the health has been broken by much suffering for three weeks, or more; and the soft parts which are cut by the surgeon have been altered by inflammation; hence the stumps seldom heal without suppuration; often they ulcerate; and sometimes the limb becomes gangrenous, or the patient is attacked with fever, and dies from internal suppurations.

On the subject of gangrene we have also some excellent and judicious observations from Mr. Guthrie; and especially from one kind of gangrene peculiar to gun-shot wounds of the extremities,—that which is the consequence of the wound of the principal arteries of a limb. The gangrene in this case commonly begins in the lower part of the limb, below the wound, perhaps in the toes and fingers, and spreads upwards; and the experience of Mr. Guthrie leads him to conclude, that this case forms an exception to the general rule of waiting in gangrene for the line of separation, before proceeding to amputate.

"Having lost all the cases of gangrene succeeding to wounds of arteries, and other cases of greater injury, in which it supervened on the third or fourth day without much previous inflammation, I began to think it an error to wait for the line of separation, when there appeared but little prospect of its formation. In two cases after the battle of Salamanca, in which I had reason to think the gangrene was of this kind, I amputated with success; a third died after amputation, but not of gangrene affecting the stump; and a fourth and fifth, which I left for the appearance of the line of separation, or the cessation of the gangrene, very soon died. This practice, in cases of severe injury, after gun-shot wounds, has succeeded in the hands of others, even in England."

After discussing all the questions and points of practice connected with amputations, generally as connected with gun-shot wounds, Mr. Guthrie proceeds, in distinct sections, to the consideration of the particular operations.

Under each head he not only describes the modes of operating, but, with a freedom and ability which experience alone

can give, he points out the nature, variety, and extent of those wounds and accidents which require the operations in question. These observations are most valuable and instructive, but scarcely admit of abridgment or analysis; and this is a book which we are most unwilling to save any one the trouble, we ought rather to say, the pleasure and profit of perusing. The account of the operations performed at the hip and shoulder-joint, are especially interesting. The former operation has been more than once performed by Mr. Guthrie, and other British surgeons; we regret to add, that in one case only has it been completely successful. But this one is sufficient to justify an operation from which surgeons in general have shrunk. The operation of the shoulder-joint has become as perfect and as successful as any other operation.

A surgeon in private practice, who performs a few annual and great operations, is still timid and apprehensive, compared to the military surgeon; and there is nothing more worthy of a passing remark, than that confidence and intrepidity which the military surgeon acquires, and which is in truth so necessary for him to have in the discharge of his important and arduous duties. Mr. Guthrie has no silly fears of hæmorrhagy and uncompressed arteries, in cases where experience has taught him confidence. He cares not, indeed, in most cases, whether he has a tourniquet or not; an instrument which in some cases is, indeed, useless, as in operations at the great joints. In these he trusts with the most perfect confidence to the manual compression of the artery above the clavicle, and on the brim of the pelvis.

"The fear usually entertained by surgeons, is that of incontrollable hæmorrhage; and Mr. John Bell (whose works have done so much good in the surgery of arteries), has here done much mischief, in persuading many young men that hæmorrhage from large arteries is not to be restrained by any pressure; which is, in my opinion, one of the principal errors of his work, in relation to military surgery, and is indeed almost as great an error as any he has laboured so effectually to overturn.

"He says, p. 415 of his Principles of Surgery, 'I will re-

peat with confidence what I have frequently affirmed, that it is one thing to suppress the pulse in the lower part of the limb, and another thing to stop the pulse in the great artery. I have tried in great operations, near the trunk of the body, to stop the blood by pressure; but though I could suppress the pulse of the femoral artery with my fore-finger, I could not command its blood with the whole strength of my body.' And in a note he says, 'the fact which I have here affirmed is of too much importance for me not to maintain it with more than common earnestness. I affirm then, that, though the throbbing of an aneurism, or the pulse in the lower part of a limb, be quite suppressed, yet the circulation is not stopped; and I entreat the young surgeon never to trust to any such mark of the compression being effectual.'

"If he wish it to be understood, that the inguinal, or the subclavian artery, cannot be commanded by any pressure, so as to prevent hæmorrhage on their division, it is merely advancing an opinion, that hardly needs a comment; for almost all the medical officers of the British army have, on many occasions, seen both vessels so effectually compressed by moderate pressure, that not one drop of blood has escaped from the orifice of the artery, after it has been divided. I am, therefore, willing to believe that this cannot be his meaning, but that he supposes a certain degree of pressure may stop the pulsation of the artery without suppressing the circulation; an opinion equally as dangerous, and erroneous, as the other; for it tends to keep the mind of the young surgeon in alarm, and thereby obstructs the free exercise of his judgment, during the whole course of many serious operations, when he often requires the greatest firmness to enable him to surmount the difficulties that present themselves. This alarm is most unnecessarily raised, for I have no hesitation in declaring, and I am supported in the assertion by all the surgeons of extensive practice in the British army, that when the pulse is suppressed in a great artery, the flow of blood is completely restrained for every purpose in military surgery. I will even say, that the flow of blood shall be entirely suppressed, and yet the pressure upon the subclavian artery above the clavicle, shall

be so moderate, that the instrument will not leave a mark upon the skin discoverable after twenty-four hours. I do not assert this without solid foundation; for I have seen the inguinal and subclavian arteries compressed and divided very many times, and I have had the femoral and axillary arteries as often between my fingers; but I never saw blood projected one inch from the orifice of these vessels without the pulsation or motion of the artery taking place; and I never saw blood flow in a stream from the orifice of any large artery. I have seen, when the sides of these vessels have not been pressed exactly together, so that the inner coats have not been in contact, that a little blood has oozed to the mouth of the artery, and that it has even dropped from it; but the moment this drop became a stream, the pulsation of the artery was sensible to the fingers, and the blood thrown out, came *per saltum*. I have never found any difficulty in holding the divided end of the femoral or axillary arteries, between my finger and thumb, whilst a ligature has been placed upon them; and I do not, therefore, believe, that the blood is propelled in these arteries with a force that is not readily overcome by moderate pressure; or that in a healthy man, any circulation goes on in an artery, when the pulse of that artery has ceased in consequence of pressure. It is not, indeed, consistent that it should; for, if the circulation can go on so as to cause a dangerous hæmorrhage, without any pulsation of the artery, the continuance of it in the smaller arteries in a state of health, would almost appear unnecessary. If it be said that it is not circulation, but merely a little blood that passes between the sides of the vessel that are not exactly in contact; I would reply, that if such an occurrence did take place, the quantity must be so small as to be unworthy the attention of the surgeon; for, if it were in greater quantity, it would be attended by pulsation of the artery.

"I do not mean, in the slightest degree, to doubt the correctness of Mr. Bell's statements of his inability to suppress the circulation in the cases of aneurism he has adduced. I mean to assert only, that the passage of the blood through a healthy artery can be effectually prevented by moderate pres-

sure; that when the pulse has ceased in a large artery in consequence of this pressure, the circulation is suppressed for every purpose in surgery; and that the surgeon may, therefore, divest himself of all fear of hæmorrhage. It is, indeed, a fact so notorious in the medical department of the army, that I need not have noticed it thus particularly, if I did not think the great authority of Mr. Bell's opinion might prevail when the practice of the peninsular war shall be forgotten."

The various doctrinal and practical discussions in which Mr. Guthrie engages, are illustrated and enlivened by a variety of cases, and observations of the highest interest.

Such a book, in short, as this, was wanted; and we now have one which ought to be in the hands of every military surgeon.

A Treatise on the Puerperal Fever, illustrated by Cases, which occurred in Leeds and its vicinity, in the years 1809-1812. By WILLIAM HEY, Jun. Member of the Royal College of Surgeons in London, and Surgeon of the General Infirmary, and of the House of Recovery, at Leeds. 8vo. pp. 238. London, 1815, Longman and Co.

[From the Edinburgh Medical and Surgical Journal, for October, 1815.]

WE have been much interested by the perusal of this very able and instructive volume. It exhibits the most demonstrative evidence of the propriety and success of a simple but decided practice, in this severe and dangerous malady; at least in the particular form of it which occurred at Leeds during the periods specified in the title-page. We say in this particular epidemic, perhaps rather in conformity with established opinions upon this subject, than consistently with the impression which the perusal of this work has left upon us. For when we add the testimony of Mr. Hey to that of Drs. Gordon and Armstrong, and still more, when we examine the nature of several of the cases related by the former in this

work, we feel disposed to doubt the propriety of the distinctions made by many writers, between the epidemic and sporadic disease.

It appears to us to be an obvious inference from the different views which practitioners and authors now take of many febrile diseases, either that the older physicians of the last generation were mistaken in their apprehensions of putridity and debility, or that the diseases of this country have actually undergone a considerable alteration in their type and character. We are disposed to believe, indeed, that there is some foundation for both these suppositions. We cannot doubt that the hypothesis of debility, and the practice of stimulation, were carried to a much greater length than sound observation would have justified; and that many of the effects ascribed to debility, were in reality the result of over-excitement, not checked in the outset by evacuations, and rather aggravated than diminished, by the cordial system which was afterwards employed. But, on the other hand, there appears to be sufficient evidence of some actual change in the character of febrile diseases since that period, dependent upon other causes than a change of medical treatment, and probably itself in part the cause of this change of medical opinion. It seems to be well ascertained, that petechial fevers have every where in a great measure declined in this country, though thirty or forty years ago they were extremely prevalent in jails, hospitals, and ships, and in the habitations of the poor. At present such fevers are rarely seen, even in the prisons and fever-hospital of London; see Willan on Cutan. Disorders, where he quotes the authority of the surgeon of Newgate, and the physician of the House of Recovery, 2d edit. p. 469; and the experience of practitioners in general will confirm the general fact. Whether these changes are inexplicable upon any known facts, (for we cannot ascribe them with Sydenham to occult changes in the bowels of the earth); or whether they are explicable upon the general improvement of the country in cleanliness, ventilation, temperance, and a better diet, which increasing wealth has introduced, we do not pretend to determine; but as facts we think they must be received. The con-

stitutions of the people seem to have acquired somewhat more of a phlogistic diathesis, and to bear and require less of the stimulant treatment to which they were formerly subjected, and a more general evacuant plan. We wish to persuade ourselves that this view of the subject is true, for the credit of the art; for if it is not, the practice of medicine must be a farce, or the former practice must have been productive of extensive injury. We are certain, at least, that in most of our febrile diseases, the dread of *typhus* and malignancy is *now* a bugbear, and that the cordial treatment is generally manifestly injurious.

The judicious author of this treatise has stated, in the most philosophical manner, the series of facts which the occurrence of an epidemic brought under his observation, adopting no theory, and using no hypothetical phrases, respecting the nature and seat of the malady; but giving a plain and inductive comment upon the obvious results of the expedients resorted to, and the natural course of events when these expedients were omitted. Insomuch that, as we have already observed, his evidence amounts as near to demonstration as experiments in pathology will admit of; and we can scarcely dissent from his inference, that much mistake has been committed in supposing that puerperal fever, when epidemic, was to be treated, in any instance, in a different manner.

It would be difficult to do justice to the view, which Mr. Hey has given of the subject, by any analysis of the volume before us, which we recommend to every practitioner to study, who may be liable to be called upon to treat this disease. For the disease is too rapid to admit of delay and hesitation, and must be attacked with as much promptitude as vigour, in order to be combated with success; and therefore the practitioner cannot have premeditated too much on the treatment which he will adopt.

The author begins by proving, in his preface, by quotations from the most distinguished authors on the subject, the extraordinary contrariety of opinion which has always prevailed respecting the disease in question, except with respect to its danger and fatality, which is generally admitted. When the

epidemic at Leeds appeared, Mr. Hey had not seen the excellent treatise of Dr. Gordon, of Aberdeen, who adopted a different and much more successful practice than had previously been used. The sequel of the volume exhibits the early fatality of the disease under Mr. Hey's management, his gradual and judicious alteration of measures, and his ultimate arrival at the same successful treatment which Dr. Gordon had recommended; under which he cured a long series of cases, some of them of the most alarming kind, without losing a single patient. This detail is extremely interesting, and displays in a high degree the candour, zeal, humanity, industry, and intelligence of the author, to whom, it is obvious, many of the females of Leeds and its vicinity are indebted for their lives and safety under that formidable epidemic.

In the first introductory chapter, Mr. Hey states the pathognomonic symptoms of the disease, to be "fever in child-bed, accompanied with pain which has no complete intermission, and extreme soreness, in the abdomen;" and then adverts to the different views which the most popular writers have entertained of the nature of the puerperal fever. While a few have considered the disease as purely inflammatory, others have supposed it to be a modification of typhus or jail-fever; and others again have adopted a middle course, and believed it to be inflammatory in its commencement, but to have a strong and rapid tendency to putrescence in its progress. Dr. Clarke, and most other writers, have generally deemed the epidemic form of the disease to be of the typhoid kind, and on that account more fatal. Dr. Clarke especially distinguishes the "low fever of child-bed, connected with affection of the abdomen, which is sometimes epidemic," from the inflammatory diseases of the uterus, ovaria, and peritonæum; and Dr. Thomas, who professes to give a summary of the opinions of the most celebrated writers of the present day, in his "Modern Practice of Physic," states, that the puerperal fever "has generally a strong tendency to the typhoid type," and requires an essentially different treatment from inflammation of the uterus, peritonæum, or omentum. This, indeed, is the general

opinion, we believe, of the profession, resulting from the precepts of those who take the lead in directing public opinion on these subjects. These precepts had no inconsiderable influence on the first attempts of Mr. Hey to cure the epidemic which appeared at Leeds. From a diligent consideration of the circumstances, there was no room for doubt that it was most similar to the "low fever" of Dr. Clarke, and to that of "a typhoid type" described by others. At first every case seen by Mr. Hey terminated fatally, with great rapidity. He found by experience, however, that purging gave great relief, though still fearful of carrying it to a great extent, and he did not venture upon the use of the lancet, in a disease "attended by such sudden and early sinking, and in which both these remedies had been so strongly condemned." The complete success, however, which attended the change of practice which he ultimately adopted, led him to the conclusion, that there is no essential difference in the epidemic and sporadic disease, except in the greater violence and severity of the former, and the more active employment of the same remedies by which both are cured.

In Chapter II. the author gives a sketch of the progress of the epidemic at Leeds, and a very perspicuous history of the symptoms, as they fell under his observation. The disease commenced in November 1809, and continued, with some considerable intermissions, till Christmas 1812, after which the author was prevented from seeing any more of it by a long illness in his own person. It attacked all ranks of women indiscriminately, not only in Leeds, but in the country around it, and in towns at some distance, and "many fell victims to the disorder, whose situation, circumstances, and precautions might have been expected to exempt them from it, if any care could have availed them to that end." Yet no connection could be traced between this epidemic and any perceptible variations of the atmosphere; for "it prevailed equally in cold and hot weather, in wet and dry seasons, in winter and summer." There was no other disease particularly prevalent at the same time, except erysipelatous inflammations, which also, according to Dr. Gordon, accompanied the progress of the puerpe-

ral fever at Aberdeen. The occurrence of this fever was not at all connected with any particular species of labour; nay it most frequently occurred after the most easy and natural labours.

We need not enter into the detail of symptoms, which are copiously and distinctly described; but we shall quote the following passage, as throwing some light on the nature of the disease, and as comprising observations that are confirmed by all the cases hereafter recorded.

"A degree of fulness in the hypogastric region was often evident from the first attack, and not unfrequently *the uterus* could easily be perceived, forming a distinct tumour above the pubes. *Pressure upon it gave exquisite pain.* In about six or eight hours, if the patient was not relieved, the swelling began to extend itself to the whole abdomen, which was soon distended to a great size, and the enlargement of the uterus was lost in the general tumefaction. A diminution in the size of that viscus was a very favourable symptom. The soreness and swelling of the abdomen occasioned great shortness of breathing, and obliged the patient to lie constantly on her back. There was always some mitigation of the disease when the breathing became slower, or the patient was able to change her position, and lie upon her side."

That this is a description of abdominal inflammation, beginning probably in the uterus, and extending to all the duplicatures of the peritonæum, who can doubt? The symptoms recorded in the next paragraph have, indeed, misled the best observers into a notion of *typhus;* but by the test of, we may almost say, unvarying success, Mr. Hey proved that these *typhoid* symptoms are anticipated by the lancet and copious purgation.

"If the disorder was not checked, great depression of strength and other appearances of sinking quickly supervened. The pulse was too rapid to be counted; the tongue sometimes, though not usually, became dry and brown, and the teeth were covered with sordes; the cheeks were flushed; the countenance was wild and expressive of great distress; and the whole body was covered with a clammy sweat. At this period

the violent pain of the abdomen often ceased; but its distention occasioned pains in the back, sides, and chest, sometimes accompanied with spasmodic paroxysms of dyspnœa. The patient became restless, and affected with vomiting, hiccough, delirium, and other symptoms which are the usual harbingers of dissolution, though not peculiar to this fever; and the melancholy scene was usually closed in a few days from the commencement of the attack." p. 24-5.

After a series of valuable practical observations on the variations in the periods of attack and termination, and of different symptoms, particularly of the rigor, pain, state of tongue, affection of the head, and condition of the blood when drawn, the author proceeds, in the third and longest chapter, to the detail of cases, which are interspersed with many practical remarks, and followed by a general view of the method of cure. The progress of his opinion in the treatment of the malady is traced in a very interesting manner. After the relation of two fatal cases, in which, as well as in all that had been mentioned to the author and his father in the practice of others, the want of success had led them to meditate beforehand upon the treatment to be adopted in the next case that should occur, the author states the views which they took of the subject. Great temporary relief had been produced by purgatives in the two preceding cases; the stools were slimy and dysenteric; and there was obviously abdominal inflammation, "which seemed, however, of a kind not likely to bear blood-letting." They determined, therefore, to adhere more closely to Dr. Denman's plan, of purging freely in the day, and procuring repose at night by an opiate; and also to evacuate the bowels early in every case by a gentle laxative, as the means of prevention. The "undesired opportunity" of putting this suggestion to the test soon occurred.

A lady was attacked with shivering, pain, and heat, about forty-eight hours after an easy delivery. The progress of the disease is fully detailed, reports being given daily, and great relief was obviously obtained from free purgation with manna and sulphate of magnesia, with intermediate anodynes, and fomentations of the abdomen. The operation of the purgatives

was followed again and again by diminution of the fever, and even of the abdominal tenderness on pressure, and two quiet nights were produced; but on the third day, the symptoms again recurred, and continued to increase, with vomiting; and on the fourth, the pain and soreness were nearly gone, and other symptoms of commencing gangrene indicated the approach of the fatal termination, which took place on the following day. The fourth case we shall quote on account of its brevity.

"The circumstance most worthy of remark in the fourth case, was the early and sudden transition from symptoms of active inflammation to those of debility and sinking. The patient was a robust woman, who was lying in of her first child. She was delivered on Sunday afternoon at four o'clock, and on the following day, she was directed to take, at intervals, a solution of sulphate of magnesia, as a means of prevention.

"At two o'clock on Tuesday morning she was attacked with the disease, and I was called to visit her about five. The pain was more severe than in any of the former cases; and was accompanied with a full strong pulse. The sulphate of magnesia had not operated. I prescribed a purging draught with sulphate of soda and manna āā ℥ss. in two ounces of infusion of senna. I also directed a cathartic injection to assist its operation. A consultation with a physician took place in the forenoon, when eight or ten leeches, and afterwards a blister, were ordered to be applied to the abdomen.

"*At three p. m.* the pulse had evidently begun to lose its strength, and other symptoms of debility had become manifest. A distention of the abdomen, which had previously taken place, advanced with rapidity; an obstinate vomiting supervened; and the disease finished its career in thirty-five hours from its first seizure.

"It will not be thought surprising, by those at least who consider the puerperal fever as a modification of typhus, or as having a strong and rapid tendency to it, that the result of this case tended to confirm our fears of having recourse to the lancet." p. 51.

The 5th case was still more rapidly fatal; for the disease

commenced twenty-six hours after delivery, and notwithstanding the patient was attended four times that day, and consultations held, she died forty-three hours after that event, and about seventeen from the commencement of the disease. The sixth case ended fatally in about forty-eight hours; and in this, some camphor mixture and bark were prescribed in consultation. In the seventh there appeared to be great predisposition to the disease during the latter part of pregnancy. Purging materially alleviated the symptoms at first, but an erysipelatous inflammation attacked the nates and pudendum on the third day, and on the sixth the patient died. In the eighth case the disease came on so late as six days after delivery, and copious purging was the remedy resorted to, together with anodyne clysters to soothe the irritation which it might occasion; and this patient with some difficulty recovered. It was remarkable, that "though the bowels were freely evacuated on the day after delivery, and never afterwards became constipated; and though, after the attack of the disease, purgatives and clysters were given every day, yet a remarkable quantity of hardened feces was repeatedly discharged."—"On a view of the last case," the author adds, "I am persuaded that, had we not been too fearful of exhausting the strength of the patient, but had purged her more briskly at first, the disease would much sooner have been brought to a close." p. 77. Soon afterwards two other cases were successfully treated chiefly by purging; but after this time four were attacked by the disease fatally.

Of the fourteen cases then here mentioned, which occurred in the author's practice between December 1809 and June 1810, *eleven* terminated in death, and *three* in recovery. The last case which he saw had exhibited considerable appearances of inflammation; purging had been the only remedy from which he observed any relief; and having seen an abstract of Dr. Gordon's practice in Thomas's Modern Practice of Physic, in which bleeding and purging were the remedies depended upon, Mr. Hey now felt strongly inclined to try the use of the lancet, notwithstanding the general impression respecting the low and typhoid type of the disease. A stout wo-

man was attacked with symptoms of puerperal fever (Case ix.) on the third day after labour, which had been accompanied by considerable hæmorrhage. After using a purging medicine and clyster, he took away seven ounces of blood, at 5 p. m. and applied a blister; at 8 p. m. the blood was found highly firm and buffy, and seven ounces more were taken, which proved more firm and buffy than the former; at 10, great relief to all the symptoms had been produced. This relief continued all next day, copious alvine evacuations being also produced, and till the evening of the following day, when a violent affection of the head came on, with strong quick pulse, which was relieved by leeches to the temples, and by the abstraction of three ounces of blood from the temporal artery. On the following day she continued better on the side of the head which had been bled, and three ounces were taken from the other, and an ounce and half more in the evening, in consequence of a relapse. On the next day some symptoms of paralysis showed themselves, and in consultation some wine and an etherial medicine were ordered. There was no farther abdominal affection; but the patient became delirious, and died on the 13th day in a state of great distress and restlessness. This case was in fact a remarkable instance of metastasis; but the entire removal of the abdominal affection, and the appearance of the blood, confirmed the author in his notion of the propriety of blood-letting. In the 10th case, which occurred soon after, he took away 20 ounces of blood, seven or eight hours after the disease commenced, and found the pain diminished while the blood was flowing, and the next morning nearly gone; purging was continued two days, and the patient recovered without further complaint.

From this time the author adopted Dr. Gordon's method, (whose treatise he had now obtained,) and which coincided with, and confirmed his own recent views; and after this period he attended a great number of patients, attacked with equal or more violence than those whom he had already treated, of whom, however, but three died, namely, in the following order, the 11th, 13th, and 15th cases; but after this period, by a still more vigorous pursuit of the same plan, he

had the satisfaction of seeing *all his patients recover.* In the three fatal cases, indeed, the circumstances were such as to afford no disparagement to the principle of the treatment employed: in the 13th case, venesection was not permitted; and in the 15th, the disease was so much subdued, that the patient went on to the end of six weeks, and perished rather from the sequelæ, than from the actual disease. We quote the following case (the 21st) as a specimen of the author's active and successful management of this previously fatal disease.

"August 3d, 1812, at one o'clock in the morning, the wife of T. W. of Hunslet, a woman of rather delicate appearance, was delivered by a midwife of her 12th child, after an easy labour of about an hour. Her discharge both at the time of labour and afterwards was said to be severe, but not excessive. On the following morning she had a shivering fit, which was not, however, succeeded by pain; and she remained well throughout the day. The after-pains were slight.

"5th.—At four o'clock in the morning, she was suddenly seized, without any previous chilliness, with a violent pain in the body, resembling labour-pain, but of much longer duration. It increased progressively during the day; and in the intervals, which were not longer than a quarter of an hour; the abdomen was sore.

"I first saw her between four and five in the afternoon, and found her crying out in pain like a woman in labour, &c."—"The patient had taken some opening medicine, which had produced one loose evacuation in the morning. The symptoms, in this case, were not the most alarming, considering that thirteen hours had elapsed since the commencement of the disease; but the pain was violent, and the loss of time was more than a counterbalance to the apparent mildness of the other symptoms. I was therefore satisfied that large bleeding in the first instance was necessary; especially as night was approaching, and the patient lived at some distance from me. I first took away twenty-five ounces of blood, without producing any degree of faintness; when I closed the orifice for a few moments, till another basin was procured; and then drew nine ounces more. She was now disposed to faint, and the pain was

much diminished. I put my finger on the orifice, and waited a while. The faintness soon went off, and the pain returned; I therefore took away six ounces more, making in the whole forty ounces. The patient becoming again very faint, I tied up the arm: she soon recovered, and remained easy. Pulse 88." (It was "112 and hard" before the bleeding.) "A clyster was injected as soon as it could be prepared, which in ten minutes produced a very copious evacuation of solid fæces. At six p.m. I gave a bolus with half a dram of jalap and four grains of calomel; and left directions that three table spoonfuls of the cathartic solution" (water eight ounces, sulphate of magnes. one ounce) "should be taken every two hours, till the bowels should be well opened, beginning two hours after the bolus.

"*Half-past ten, p. m.* The pain had returned soon after I left her, and with as much severity as before the bleeding. She had had three small watery stools, which did not appear to be the effect of the purgatives. The heat of the skin was now considerable, and was attended with much restlessness. The pulse was at 120, and still hard. The tongue was rather white, and the abdomen was much more tender; particularly in the region of the uterus, which had become enlarged, and easily distinguishable. The increase of all the symptoms since my former visit seemed not only to justify the quantity of blood then taken, but to require a further evacuation. I tied up the arm, and took eight ounces from the same orifice, when, the patient proving faint, I desisted. The pain was much alleviated by this second bleeding, and the pulse came down to 84. I ordered the solution to be taken every hour.

"6th. *Eight a. m.*—She had remained nearly free from pain all the night; the soreness had greatly abated, the uterus was diminished in size, and she had slept several hours. The skin was moist, and of a natural heat; the pulse at 100. She had taken above two ounces of magnes. sulphas, besides the purging bolus; and had had many small evacuations, which, however, contained but little fæces. Two boluses were therefore prescribed, with fifteen grains of jalap and two of calomel in each, to be taken with an interval of two hours; and the solution was ordered to be afterwards continued.

"*Six p. m.*—Both the boluses had been taken, and the remainder of the third ounce of magnes. sulphas, which had procured a great number of natural stools. The patient continued free from pain; the soreness of the abdomen was quite gone, and the uterus was scarcely to be felt.

"7th.—She had slept the greatest part of the night, and the pulse was at 84. The bowels were kept open, and she continued convalescent."—p. 131.

We cannot help remarking, on the perusal of this and most of the cases here related, how very easy it would be for any treatment of this sort to lose its credit; and how very unlikely that it should ever gain credit, against the prejudices of education, in ordinary hands; because its failure to cure, when timidly used, or when resorted to late, or by men who did not thus assiduously repeat their visits at intervals of a few hours, in proportion to the danger of their patients, would probably be construed into actual injury. And it has been thus perhaps from the inefficient influence of a small bleeding, begun too late, or repeated after too long an interval, that the natural tendency of the disease to rapid lowness may have been supposed to be the result of, or at least to have been aggravated by the ill-managed remedy. The necessity of proportioning blood-letting, in all cases, to the actual effect which it is observed to produce upon the patient and the disease, and not by any arbitrary measure of ounces, if we would do justice to the patient, and obtain the full agency of the remedy, must be very obvious; and it is perhaps to this assiduous and judicious use of the means, that the great success of Mr. Hey is to be chiefly imputed.

In the conclusion of this chapter there are many excellent practical observations, which the length to which we have already extended our remarks will not permit us to recapitulate. Bleeding and purging, when employed in a proper and seasonable manner, were obviously adequate to the cure of the disease, and other remedies were merely auxiliary. Dr. Gordon affirmed, that one bleeding of 24 ounces, if performed within six or eight hours of the attack, together with a single purgation, never failed to cure the disease; that if called within 12 hours he promised success from bleeding; but if the

period were later, as from 12 to 24 hours after the attack, he could not promise success, though he deemed it the only effectual remedy. Mr. Hey justly maintains that no such precise limit can be laid down in all cases; for while one of his cases terminated fatally in less than 18 hours, in some others bleeding was successful, when a delay of more than 24 hours had occurred. Nor does he admit any similar limitation of the quantity of blood to be drawn: he thinks, indeed, that there is scarcely any other limit than the removal or considerable diminution of the pain, "provided all that is requisite be drawn within twelve hours of the first evacuation."

"If the disease is clearly ascertained, no other consideration is of much importance. The state of the pulse affords little information either as to the propriety of bleeding, or the quantity of blood proper to be taken away; and if we are deterred, either by the apparent weakness of the patient, by the frequency and feebleness of the pulse, or by any other symptom, from bleeding copiously, we shall generally fail to cure the disease." p. 161.

Immediately after bleeding the most speedy and most effectual means of purgation were resorted to, and continued, so as to produce an evacuation once in three or four hours, which was maintained for two or three days, or longer if necessary. This accords with Dr. Gordon's precept, that "the purging is to be early excited, and to be continued without intermission, till there be a complete termination of the disease." Mr. Hey always found *opiates* destitute of any advantage, affording but an insidious truce, and rather tending to prolong the disease. Circumstances may render purgative or emollient injections useful; fomentations, if properly applied, are soothing, and never did harm; but blisters are inconvenient, and seldom necessary.

If these means fail to cure the disease, from being employed too late or in an improper manner, the mischief produced in the cavity of the abdomen, whether by extravasation, suppuration, or gangrene, is beyond the reach of medicine; and nothing can be done, save to alleviate distressing feelings; cordials and tonics can afford no other advantage. Purging, however, is proper in every stage of the disease, unless gangrene has

actually taken place; and should be excited, if possible, when bleeding has become inadmissible.

The success of this practice, then, was as follows. Before the plan of bleeding was adopted, of fourteen patients only three recovered; but after the 15th case, which occurred in the author's practice, of thirty-three patients only three died; and the last twenty-six recovered in uninterrupted succession. Yet this was an *epidemic* puerperal fever, which has been said by most of the writers to be of a low or typhoid character. This is at least the third example of an epidemic fever of this sort, which was combated effectually by copious and active evacuations only; for those of Aberdeen and Sunderland, described by Drs. Gordon and Armstrong, were of the same species. When we consider what a general bugbear typhus, (i. e. debility, putrescency, &c.) was, at the time when most of the books on this subject were written; how distinctly in some cases the general opinion has veered round in that respect of late; how very much like low fever are many of the abdominal inflammations after the acute stage is past, where they have been neglected or maltreated; and how injurious we find the use of cordials, bark, and other excitants in the common fevers of this country at present; we are disposed to agree with the author before us, that the puerperal fever is always essentially the same disease, "inflammatory at its beginning, and putrid only in its progress;" and that the distinction between the *sporadic* and *epidemic* disease is so far only important in practice, "that the epidemic disease requires more prompt attention, and more vigorous treatment;" for that "the means of cure are precisely the same in both; but in the latter their measure is greater and less limited, and the period within which they must be employed is far more circumscribed." p. 182.

Whatever may be the general inference upon this subject, this little treatise will be deemed a perspicuous and judicious history of a severe and dangerous epidemic, characterized by sound pathological knowledge, clear arrangement, and great correctness of composition, and worthy to be classed with the best monographs of modern medical literature.

ORIGINAL PAPERS.

FOR THE ECLECTIC REPERTORY.

On Re-infection in the Ship Fever of Tropical Climates.

BY SAMUEL POWEL GRIFFITTS, M. D.

Dr. W. Pym, inspector of British hospitals, published, in the Edinburgh Medical and Surgical Journal for April 1816, a paper entitled "Proofs of the Bulam Fever attacking the Human Frame only once." This publication forcibly attracted my attention. The doctor asserts, that the disease called yellow fever in our country, but which he has specifically named Bulam fever, never attacks the same person twice. Dr. Fellowes, in his account of the pestilential fever of Andalusia, fully confirms this fact. It is well to compare the opinions entertained by medical men in different parts of the world, and more especially the facts related by them. Concerning the fever in question I have no desire to revive controversy. After a long and painful acquaintance with it, I am well convinced that its proper character is, the *ship*, or *jail*, or *hospital fever of tropical climates;* that it is, of course, a disease *sui generis*, distinct from the endemic or indigenous yellow fever of the West Indies, and from the bilious remittent fever of hot climates. I have seen it, and carefully attended to its nature and progress, in Philadelphia, in the years 1793, 1797, 1798, 1799, 1302, 1803, and 1805; having, during all this time, been absent from the city only two weeks in 1793, after a severe attack of the disorder. My attention was arrested in 1798 by observing that persons who had had the disease before, were then exempted from it, although few others escaped. I mentioned the fact, and was much ridiculed for my remark. This could not hinder my continued attention to the subject; and

my opinion being confirmed by succeeding observations, I can now safely assert, that during the seven years of its appearance amongst us, I did not meet with one instance of the same person's being infected with this disease the second time. I observed the fever pass through large families, attacking those only who had not been before infected. These facts were too powerful not to have their proper weight.

I acknowledge my having attended persons in this fever, who said they had had it before. This I do not mean to controvert; I only give my own experience, as to never having myself seen it twice in the same person. I know that several of my medical friends, who regard the Bulam fever or ship fever of tropical climates, as a different grade of the bilious remittent, differ widely from me as to facts and theory—and with their ideas of the fever in question, it cannot well be otherwise. I merely wish to give the result of my own observations; believing that a fair and correct account of interesting facts, as they occur, should be collected and spread before the medical world. And perhaps such collections will be more valuable by being unaccompanied with theoretical remarks. They will serve to give us more correct ideas of diseases; and as to the present one, may assist in solving the question, so much agitated, whether it be contagious or not—or in other words, communicable from one person to another: a most important question; on the right decision of which, the comfort and safety of those exposed to it in a great degree depend.

As an additional fact in favour of this fever not attacking the same person a second time, it will be well to remark, that none of the physicians of Philadelphia, who were infected with it in 1793, have since died of this disease—and it may not be foreign to observe, that those who have once suffered from attacks of bilious remittent or intermittent fevers, are much more liable than others to be again affected by them when exposed to the same causes; another striking discrimination between the remittent bilious fever, and the Bulam or ship fever of tropical climates.

Philadelphia, 8*th mo.* 13, 1816.

FOR THE ECLECTIC REPERTORY.

Case of Hernia.

BY JOSEPH P. NANCREDE, M. D.

ANDREW PATEN, a coloured man, about 30 years of age, strongly built, and of a large stature, having always enjoyed good health, had been subject to a scrotal hernia on the right side for the last five years, but which being well maintained in its situation by a truss, had never occasioned the least inconvenience. On Friday, August 10, while raising his carriage, (he being a coachman), he made an effort, which was succeeded by a sudden pain in the left groin, but which appears, however, not to have been sufficiently acute to excite alarm, or even to induce him to examine the spot, which was the seat of the pain. This occurred at about three in the afternoon, and in the evening, as usual, he returned home, complaining merely of fatigue, and went to bed without any examination, although the pain had not abated. At about eleven, however, he was roused by the increase of his sufferings, which were now so violent as to make him cry out; vomiting and hiccup made their appearance simultaneously, and the pain, extending throughout the abdomen, but more particularly below the navel, became excruciating. His sufferings had alarmed him and medical assistance was requested at about half past one. Upon examining and questioning the patient as to the probable cause of his colic, (for thus it appeared to me at first sight) no satisfactory information could be obtained. After some further investigation, however, he recollected having felt in the afternoon a small *lump* upon the left groin, and added, that his most violent pain had been at that spot. This tumour, about the size of a goose egg, proved upon examination to be a scrotal hernia of the left side, strangulated. Attempts had already been made by the patient to effect the reduction of the tumour, and I repeated them my-

self, in vain. But finding the tumour very hard, as well as the pulse, I went home in search of my lancets, having previously administered a dose of ol. ricini. On my return, however, after keeping the muscles relaxed for some time, the hernia was almost immediately reduced. The patient soon felt relieved, the pain had disappeared, and not the least vestige of the tumour remained, when I left him dosing.

A couple of hours afterwards the symptoms of strangulation were renewed, and continued the same as previous to the reduction of the hernia. No evacuation having taken place, a second dose of ol. ricini was ordered, but almost immediately vomited. A third cathartic, which he kept down, produced no effect whatever. It was then deemed necessary to take ten ounces of blood from the arm, which however failed to procure any relief. At twelve in the forenoon no abatement of the pain could be perceived, although the pulse was softer, but the vomitings and hiccups had disappeared: no passage had yet been procured, a dose of calomel and jalap was therefore prescribed. Having seen him a third time in the afternoon, and no amelioration being visible, the abdomen becoming painful to the touch, and tumefied, and still no evacuation, a second dose of calomel, with emollient injections were recommended, and the patient was bled a second time. The same situation manifested itself in the evening, when the patient was again bled for the third time. Although the reduction of the pulse was considerable, yet it procured no relief. The vomitings had occurred twice in the afternoon. Fomentations on the abdomen were ordered with the injections, but with the exception of a little relaxation in the tension of the abdomen, no effect was produced. An infusion of senna was administered also in vain.

I visited him early on the morning of Sunday the 12th, and found that his sufferings had not increased, although he had experienced no relief. He had not slept any during the night. The abdomen continued painful and tumefied, but he complained much more of pain in the groin on the right side than at any other point; no passage; the injections, fomentations,

and the infusion of senna, were directed to be continued. The pulse had become tense and tremulous.

The case proving obstinate, I requested the advice of my friend and neighbour, Dr. Povall, who called to see the patient with me, and agreed in opinion that the symptoms of strangulation most probably arose from a stricture of the hernial sac, that had been reduced with the intestine. It was determined at his suggestion to apply a large blister on the abdomen, and to insist upon the injections of large quantities of warm water, with the hope of overcoming the obstruction which existed. The blister did not produce on the skin or system any effect whatever, and the other remedies made use of were equally ineffectual. A copious bleeding was ordered in the afternoon, owing to the hardness of the pulse. The night from Sunday to Monday was equally restless. On Monday, his situation continuing the same, it was agreed between Dr. P. and myself that a dose of gum gamb. and calomel should be given, and cold water poured on the lower extremities. No effect whatever from either. His sufferings as great as the day previous. The vomiting and some hiccup had occurred, but gave way to the camphorated mixture which was now recommended.

On Tuesday morning his pulse was considerably depressed, the tension of the abdomen had subsided, and it was much less painful, but the extremities were cold, accompanied by clammy sweats. The voice had undergone some alteration, constant anxiety and restlessness were also observed. The injections were continued during the day, and a decoction of tobacco was also added. Notwithstanding the treatment the inflammation maintained its ground. No passage could be procured. Several medical gentlemen saw the patient in the course of this day, and agreed with me in the opinion that very little hope could be entertained. At the suggestion of one of the gentlemen, quicksilver was administered in the proportion of an ounce, but also in vain: it was repeated equally in vain. Dr. Parrish was called to see the patient in consultation on Wednesday, and concurred in opinion with

Dr. Povall and myself as to the probable cause of those very dangerous symptons.

The pulse continued to sink, and, with some remissions, when it would rise in an unaccountable manner, gradually lost both its strength and regularity. Vomitings, but more especially the hiccup, became very troublesome, and the least motion produced fresh pains. The camphorated solution was of service in relieving him from the hiccup. In this situation, when every remedy had failed, he kept lingering until the night of Thursday to Friday, when he expired—the seventh day of his disease.

I proceeded the next morning to the opening of the body, accompanied by Dr. Povall.

On opening the abdomen we found the whole mass of the intestinal tube, commencing at the strictured part and extending upwards, distended with air: the vessels of the omentum, as well as those of the mesentery, very much injected with blood, and the greatest portion of the intestines bearing evident marks of inflammation. The seat of the disease, however, was confined to the jejunum, which for the length of twelve inches had lost its colour and was in a complete state of sphacelus. A portion of this intestine was confined in the inner portion of the abdominal ring, where the hernial sac formed a stricture round it, which having also participated in the general mortification, was totally disorganized, and could easily be torn away by the nail. So complete had been this adhesion, that when it was ruptured by a very slight effort, a hole in the intestinal canal, about the size of a shilling, was produced. We also noticed another hole near it, of the same size, having all the appearance of an ulcer. Having cut open the intestine at its most diseased point, for a few inches, pus, and a remarkable black appearance on the internal coat, were observed. Several black spots here and there were also noticed in this vicinity. A remarkable spot about the size of a half dollar, attracted our attention. It was situated about the middle of the transverse portion of the colon. It was very evident to us that the intestines contained in the right side of the abdomen, but more particularly in its lower region, had been the

seat of a more extensive and acute inflammation than those situated on the left. The inguinal ring, which was diseased, as we have already noticed, on the left side, had protruded in the abdomen as much as an inch, by the increase of its volume.

Philadelphia, August, 1810.

OBITUARY NOTICE.

[From the Edinburgh Medical and Surgical Journal, for July, 1816.]

DIED, on Tuesday the 18th instant, (June) in the 82d year of his age, Mr. THOMAS HENRY, President of the Literary and Philosophical Society of Manchester, Fellow of the Royal Society in London, and Member of several other learned Societies both in this country and abroad. As a practical and philosophical chemist, he had obtained a high and merited reputation. His contributions to that science, besides a small volume of Essays and his Translations of the earlier writings of Lavoisier, which he first introduced to the notice of the English reader, consist chiefly of Memoirs, dispersed through the Transactions of the various Societies to which he belonged, and relating both to those parts of chemistry that are purely scientific, and to those which have a connection with the useful arts. On a subject intimately connected with the success of the cotton manufacture, (the employment of Mordants or Bases in dyeing,) "Mr. Henry was the first," to use the words applied to him by a subsequent author, "who thought and wrote philosophically." In the introduction, too, of the new mode of bleaching, which has worked an entire revolution in that art, and occasioned an incomparably quicker circulation of capital, he was one of the earliest and most successful agents. In addition to the acquirements connected with his profession, he had cultivated, to no inconsiderable degree, a taste for the productions of the Fine Arts: he had

obtained a knowledge of historical events remarkable for its extent and accuracy; and he had derived, from reading and reflection, opinions to which he was steadily attached, on those topics of political, moral, and religious inquiry, which are most important to the welfare of mankind. For several years past, he had retired from the practice of medicine, in which he had extensively engaged, with credit and success, for more than half a century; and, from delicate health, he had long ceased to take an active share in the practical cultivation of science. But possessing, almost unimpaired, his faculties of memory and judgment, he continued to feel a lively interest in the advancement of literature and philosophy. Retaining, also, in their full vigour, those kind affections of the heart, that gave birth to the most estimable moral qualities, and secured the faithful attachment of his friends, he passed through a long and serene old age, experiencing little but its comforts and its honours, and habitually thankful for the blessings with which Providence had indulged him.

MEDICAL AND PHILOSOPHICAL INTELLIGENCE.

On the Bad Effects of the Incautious Use of Magnesia. By Everard Brande, Esq.

[From the Journal of Science and the Arts, No. II, for 1816.]

At a time when domestic empiricism is so prevalent as at present, it is important to point out the dangers which may arise from the uses, or rather the abuses of the most simple remedies.

Every medical practitioner must have repeatedly witnessed the serious, and sometimes the fatal consequences attendant upon the imprudent use of the stronger medicines, which are so extensively supplied for family consumption, particularly preparations of antimony, mercury, and opium, which, under a great variety of seducing forms and titles, are constantly employed; generally, however, they are, I believe, not sufficiently aware of the prejudicial effects of the too liberal use of magnesia; either those which may arise from its chemical action upon the urine, which are more immediately observable and common, or which may arise from its mechanical action, as an extraneous insoluble substance, and which are more remote, obscure, and rare.

I need not dilate upon the former, but may refer to my brother's observations upon that subject, published in the Philosophical Transactions for the year 1810, which, I regret, are too little attended to; and with respect to the latter, shall confine myself to the recital of the following case.

A lady was recommended to take magnesia, in consequence of some very severe nephritic attacks, accompanied with the passage of gravel. She was desired to take a tea-spoonful every night; and Henry's calcined magnesia was preferred, as that always operated upon the bowels and "carried itself off,"

which other magnesia did not, but, on the contrary, felt heavy and uneasy in the stomach. The dose was gradually increased to two tea-spoonfuls, in order to produce effect upon the bowels, which this quantity never failed to do; the symptoms for which it was ordered were soon removed, but the plan was persevered in for two years and a half, with little intermission or irregularity; so that as the average weight of a tea-spoonful is at least forty grains, and the average dose was a tea-spoonful and a half, it may be presumed that she took during the above period between nine and ten pounds troy.

In the course of the last autumn she suffered severely by a miscarriage, and shortly afterwards by an attack of biliary calculi; subsequent to which she became sensible of a tenderness in the left side just above the groin, connected with a deep-seated tumour, obscurely to be felt upon pressure, and subject to attacks of constipation, with painful spasmodic action of the bowels, tenesmus, and a highly irritable state of stomach; these attacks recurred every two or three weeks, varying in violence, but requiring the use of active remedies; during one of them, about the middle of last March, a large quantity of sand was voided by the rectum, attended with a peculiar acute and distressing pain in the seat of the tumour above mentioned. This was lost. The following day, however, the same kind of evacuation happened again, and to the same extent, which being saved and measured, was found to amount to two pints. Another attack took place upon the 5th of April, when several irregular lumps of a soft light brown substance were voided, having the appearance of a large mass broken down, and when dry extremely friable: a part of each of these two last were subjected to a careful analysis, and found to consist entirely of sub-carbonate of magnesia concreted by the mucus of the bowels, in the proportion of about 40 per cent.

The use of magnesia was now given up, and that of an active purgative medicine enjoined, with some other necessary directions, and there is every appearance of returning health, although some slight attacks have recurred, and small portions of the same concretion still occasionally come away.

An instance, in many respects resembling this, has lately occurred in the practice of some gentlemen of eminence in this town, in which not only large quantities of a concretion of a similar description were voided, but upon examination after death, which took place perhaps six months after any magnesia had been taken, a collection, supposed to be from four to six pounds, was found embedded in the head of the colon, which was of course much distended. Some notes which were made of this case are, I fear, not to be found.

The Marquis of RIDOLFI'S *Method of separating Platina from the other metallic substances which are found with it in the state of Ore; from the "Giornale di Scienze ed Arti," published at Florence.*

[From the Journal of Science and the Arts, No. II, for 1816.]

THE Marquis Ridolfi, after giving a detail of various experiments which he has made upon platina, proceeds thus: "No one has been able to combine sulphur with platina, so as to form a sulphuret of that metal. From this peculiarity of platina, the idea struck me, that if one could convert the other metallic substances found in platina into sulphurets, it would be easy to purify that metal. With this view, I took an ounce of crude platina, and separated from it some of the extraneous substances usually mixed with it. I washed it with nitro-muriatic acid, diluted with four times its weight of water. I then washed it in hot water, with a view of removing portions of iron and of gold which might be in the powder; but I afterwards found these washings useless. I then melted the mass with half its weight of pure lead, and threw it into cold water, and thus obtained an alloy which was pulverised and mixed with an equal portion of sulphur. I threw the mixture into a white-hot Hessian crucible, which was instantly covered, and let it remain in an intense heat for ten minutes. I then suffered it to cool gradually. It contained much dross, and a brittle

metallic button composed of platina, lead, and sulphur. I then again fused it with a small addition of lead, and when it had cooled I found that the sulphur was in the dross, and that there only remained an alloy of platina and lead.

I then heated this alloy to whiteness, and beat it with a hot hammer on a hot anvil, which forced out the lead in fusion. Here I must observe that unless the alloy is white-hot the beating must be suspended, as it will break.

I thus obtained platina so pure as to make with it a capsule, a spoon, wire, and leaves which were nearly as thin as gold leaf. It was ductile, malleable, and as tenacious as that obtained from the ammoniacal muriate. Its specific gravity was 22,630.

This description is sufficient to show the purity of the platina. I repeated the process several times. I did not always find the platina in a lump at the bottom of the crucible; it was sometimes scattered in globules amongst the dross. In this case it is only necessary to heat the mass with a little diluted sulphuric acid, the globules are soon liberated from the dross, and sink to the bottom of the crucible. Collect and wash them, and submit them to the same operation of the hammer, as if the platina had been found united in one mass with the lead. I did not ascertain whether all the metals contained in the ore had become sulphurets, but they were all separated from the platina during the fusion and the formation of the sulphuret of lead.

Proceedings of the Royal Society of London.

[From the Journal of Science and the Arts, No. II, for 1816.]

Feb. 29. A paper was communicated by Mr. Ivory, containing an investigation of the theory of capillary attraction, a subject which, notwithstanding the numerous and important experiments that have been made upon it, still remains in much obscurity. Mr. Ivory advocates the Newtonian hypo-

thesis, and adduces several proofs of the correctness of Mr. Leslie's enquiries, published in the year 1802 in the Philosophical Magazine. The paper contained a series of mathematical investigations relating to the subject, which were not of a nature to be read before the Society.

The reading of a letter from Dr. Brewster to the President was commenced, and continued during two successive sittings, "on the communication of double refraction to glass and other substances, by mechanical compression."

March 14. A Paper by Charles Babbage, Esq. F. R. S. was received, containing further remarks on the calculus of functions; the details were not such as could be entered into at a public meeting of the Society; the paper, therefore, was merely announced.

March 21. Sir Everard Home communicated some experiments to ascertain the mode of action of specific medicines: they related principally to that singular and efficacious remedy, the eau medicinale d'Husson. A variety of facts and statements were adduced, to prove that these medicines produce their effects by entering the blood, and acting directly upon the affected parts. Thus, mercury requires to be received into the circulation, before it can act upon the syphilitic virus, or remove the primary symptoms of the disease; and the eau medicinale must enter the blood before it can remove the gout. Mercury, and the eau d'Husson, are regarded as the only two known specifics; and it is assumed, though we think that farther researches are required to give firmness to the conclusion, that the eau medicinale is a vinous infusion of the roots of *Colchicum autumnale*, or meadow saffron. In the course of his communication Sir Everard throws out some curious hints upon the modus operandi of other medicines. Some acting upon the secretions of the stomach, and thus indirectly modifying the constitution of the blood; while others produce their effects in consequence of direct mixtures with that fluid. This is sometimes the case where we should least expect it. An infusion of ipecacuanha thrown into a vein excites vomiting, and opium produces drowsiness; and colchicum sickens, and perhaps cures the gout. Is it legitimate

hence to infer, that all these medicines, when taken into the stomach, are inert till they are received into the blood, and distributed to the parts upon which they produce sensible effects?

A paper on the composition and combinations of phosphoric acid, by Thomas Thomson, M. D. was commenced, and concluded at a succeeding meeting. According to Lavoisier's original researches, one part by weight of phosphorus unites to one and a half of oxygen to constitute phosphoric acid, a result which has been verified by several succeeding chemists, and more especially by Sir Humphry Davy, who regards this acid as composed of 20 phosphorus + 30 oxygen. But, according to the present analyst, 100 phosphorus unites only to 123.46 oxygen to produce phosphoric acid. Rose found the quantity of oxygen yet smaller. Dr. Thomson verifies his conclusion by reference to the analysis of phosphate of lead, and by taking a mean of methods, ultimately considers phosphoric acid as consisting of 100 phosphoric + 123,37 oxygen. He then proceeds to examine the compounds which the phosphoric acid produces by combining with lime, the phosphates of lime, of which, he conceives, there exist no less than six varieties, each of definite constitution: they bear the following names, 1. Quadrosteo-phosphate; 2. Binosteo-phosphate; 3. Bige-phosphate; 4. Osteo-phosphate; 6. Ge-phosphate. The constituents of many other phosphates are detailed in this communication; but as it would be indecorous to criticise a paper not published, and as without criticism the details would be of little avail, it is unnecessary at present to pursue them. Dr. Thomson infers from his numerous experiments, that the atomic doctrines of Berzelius are not worthy the confidence which he once put in them.

Proceedings of the Royal Society of Edinburgh.

[From the Journal of Science and the Arts, No. II, for 1816.]

April 1. Dr. Murray communicated some additional Remarks on the Construction and Use of a Lamp for illuminating Coal Mines. The lamp was exhibited: it is well calculated for giving a strong steady light, and from being supplied with air from a tube reaching to the floor, affords great security.

April 15. Dr. Murray communicated the first part of a Paper on the Analysis of Sea Water. The methods employed were suggested by the views formerly delivered in Dr. Murray's paper on the analysis of the mineral waters of Dumblane, and the conclusions were conformable to these views.

April 29. Mr. Hugh Murray read an essay "On the Ancient Geography of Central and Eastern Asia, with Illustrations, derived from recent Discoveries in the North of India." Mr. M. conceived that the ancients, particularly Ptolemy and Pliny, knew more respecting this quarter of the world than is generally supposed. The modern discovery respecting the course of the rivers of the Punjab, and their union into one, before falling into the Indus, is a mere restoration of Ptolemy's map of these rivers. The western tributaries, so erroneously delineated by the moderns till the Cabul mission, are represented by him with nearly equal precision. Mr. M. conceives that Ptolemy's statements, carefully analysed, form a pretty correct outline of central and eastern Asia. Thus the extensive tract of the Sacarum Regio, bounded on the south by India, from which it is separated by the Imaus (Hemalleh), corresponds in all its features with Little Thibet. Scythia extra Imaum, bounded by India beyond the Ganges, from which it is separated by the Mons Emodus, will then be Great Thibet, extended indefinitely into Tartary. Serica, then, bounded on the south partly by India beyond the Ganges, and partly by Siam (Sinarum Regio), will, under some modifications, be China. The very character of the Seres, mild, timid,

unwarlike, jealous of foreigners, and carrying on trade only at fixed frontier stations, represents exactly and exclusively the modern Chinese. Mr. M. then endeavours to show, that the prevailing systems of d'Anville, Gosselin, &c. are founded on an undue contempt of ancient authorities, and upon some slight resemblances of name, which, compared with the grand and permanent features of nature, cannot be allowed much weight in such an investigation.

At the same meeting Dr. Brewster laid before the Society a Paper on a new optical and mineralogical Property of calcareous Spar. Having formerly shown (Phil. Trans. 1815, p. 270) that the colours exhibited by some specimens of calcareous spar were produced by a thin film or interrupting stratum which divided the polarised light into its complementary tints; Dr. Brewster examined several new specimens which possessed this property, in order to ascertain the axes of this film. In the course of this examination he discovered that a prism could be cut out of a rhomboid of this kind, which, when combined with another prism of common calcareous spar, exercised such an action upon the transmitted light, that the combined prisms possessed none of the properties described by Huygens and Newton, that is, *none of the four images vanished in any position of the second prism, but continued visible during the whole of its revolution.* The combined prisms however recovered their usual property when the opposite face of the first prism received the incident pencil. Hence it follows, that the pencils were depolarised by the interrupting film; and Dr. B. has shown that the film has all its axes constantly inclined 45° to those of the mass which contains it. As the particles of the film are not symmetrically combined with those of the mass, they are not joined by their poles, and consequently they do not come into optical contact, light being always reflected at the junction. Some specimens possess two and even three sets of films or veins, each set being parallel to the common sections of the three surfaces which contain the solid angle.

May 6. Dr. Brewster read a Paper "on the Communication of double Refraction to Glass, and other hard and soft sub-

stances that refract singly, by mechanical Compression and Dilatation." Having inferred from the optical properties of heated glass, that its doubly refracting structure was owing to a variation of density, Dr. B. endeavoured, by means of screws, to produce the same mechanical change upon glass, and he found that in every case the glass was converted into a doubly refracting crystal while the pressure was continued. He next took long plates of glass with polished edges, and found that by slightly bending them with the hand, the convex or dilated side had the same structure as one class of doubly refracting crystals, while the concave or compressed side had the same structure as the other class. Muriate of soda, fluor spar, diamond, obsidian, semi-opal, horn, tortoise shell, amber, gum copal, caoutchouc, rosin, phosphorus, the crystalline lens, and the sclerotic coat of fishes, and other substances that have not the property of double refraction, receive it by compression or dilatation; while no effect whatever is produced upon doubly refracting crystals by the most powerful pressure. Many curious results were obtained by inclosing the glass in fluid metal and observing the changes which it underwent from the contraction of the metal in cooling. Upon the preceding principles is founded a *chromatic dynamometer* for measuring the intensity of forces, and various instruments for indicating differences of humidity and temperature by the expansions or contractions which they produce.

The second part of this paper related to the communication of double refraction either transiently or permanently to animal jellies, by gradual induration, or by mechanical compression or expansion.

It follows from these principles that in all crystals of one class there is a difference of density related to the axis; that in those of the other class, the difference of density is related to a line at right angles to the axis; and that in those crystals which have the structure of both classes the difference of density is related to two rectangular axes.

May 20. The conclusion of Dr. Murray's Paper on the Analysis of Sea Water was read.—He gave also the result of an analysis of a salt which is formed in the large way from the

brine of sea water, which seems hitherto to have escaped observation. It is a sulphate of magnesia and soda which crystallizes in very regular rhombs, occasionally truncated on some of the edges and angles. It contains a much smaller quantity of water of crystallization than either sulphate of soda or sulphate of magnesia; is less disagreeable to the taste, and differs from both in all its other properties. It has not hitherto been applied to any useful purpose, but it may probably form a very excellent purgative salt.

A Barometer was exhibited to the Society with a communication from Mr. Kennedy, suggesting a mode of rendering this valuable instrument more portable, and less liable to damage by the concussion of the mercury against the upper part of the tube: this it is proposed to prevent by introducing a small bell-shaped bulb of glass, attached to a spiral spring and fastened to the top of the tube. This improvement appears to be calculated to prevent the accidents which so frequently occur in the use of this instrument.

Dr. Gordon communicated certain observations to the Society, tending to establish the pathological fact, that the appearance called the *buffy coat*, or *inflammatory crust*, is not confined to venous blood, but is also occasionally seen on arterial blood, in similar states of the system. Dr. G. had himself an opportunity of seeing this appearance on arterial blood in one instance; and three other instances, in which it had occurred, were mentioned to him by Dr. Gregory, Mr. Ashburner, and Mr. Wishart.

Dr. Gordon also stated to the Society, that by a series of observations on the muscles of the living human body, during surgical operations,—on the muscles of limbs immediately after amputation,—and on the muscles of several of the lower animals, in a variety of circumstances, he conceived he had established, that the muscular fibre, during its contraction, does not exhibit the slightest appearance of rugæ, but remains perfectly straight; and that it does not undergo any perceptible enlargement in its transverse diameter.

May 27. Mr. Mackenzie read a Criticism on the Tragedy of Bertram lately published by Mr. Maturin.

June 3. Mr. Alison read a Part of a Memoir on the Life and Writings of the late Lord Woodhouselee.

A Paper by Mr. Cadell was read, "on the Lines that divide each semi-diurnal Arc into Six equal Parts."

The intertropical parts of these lines for the climates of Greece and Italy constitute the hour lines on the antique sundials. Most of the writers on gnomonics have considered these lines as great circles; Clavius alone demonstrates that they are not great circles: and afterwards Montucla states, but without discussion, that they are curves of a peculiar nature. The celebrated and profound astronomer Delambre, having examined only the portions that occur on the Greek dials, controverts the opinion of Montucla.

The object of the Paper is to show that the curved surfaces, whose sections form these lines, are undulated, and of the nature of cones, the apex of one undulation being as much elevated above the equator as the apex of the next undulation is depressed below it.

To see the curvature of these lines it is sufficient to draw them on a globe; and the undulated cone is completed by conceiving the diameter of the sphere, which has described the first branch, to move progressively and continuously between the two parallels that touch the horizon, until the extremities of the diameter arrive at the points from which they sat out.

If it be proposed, for example, to draw on a globe the curve which contains the third and ninth antique hour line, that the figure may be more conveniently delineated, elevate the pole about 60°, and divide each semi-diurnal arc into two equal parts; a line drawn through the points of division is one bicrural branch of the curve; this branch terminates at a point in the greatest, always seen parallel; and to complete the curve the semi-diurnal arcs belonging to this point, considered as the mid-day point of a horizon, (forming the same angle with the equator as the first horizon, but on the other side), are to be divided into two equal parts, and the points of division being joined, a complete re-entering curve is formed on the surface of the sphere. A diameter of the sphere revolving,

with its extremity applied to this curve, forms the undulated conical surface; the portion of the diameter on the other side of the centre forms at the same time an opposite cone equal and similar.

The five undulated surfaces, each of which contains a pair of the antique hour lines, have each a different number of undulations.

At the same meeting a Paper was read by Dr. Jackson of St. Andrews, containing an elementary Demonstration of the Composition of Pressures.

June 17. Dr. Murray read a Paper entitled "A general Formula for the Analysis of Mineral Waters." The object of the paper was to give one method applicable to the analysis of all waters, instead of the diversity of methods hitherto employed.

Dr. Brewster laid before the Society a notice respecting some new discoveries on light. He found that water exists in nitrate of potash in the state of ice;—that the division of the pencil in doubly refracting crystals is produced by strata of different refractive powers; that one of the images becomes nebulous, as in the agate, when one set of the strata is broken down and irregularly disseminated among the other strata; and that in certain crystals any one of the two images may be rendered nebulous, or may even be extinguished by a particular process. This notice contained also a general view of the distribution of the polarising influence in tubes and cylinders of glass.

Cinchona Bark.

[From the London Medical Repository, for August, 1816.]

THE opinions of authors have very widely differed regarding the best species of this bark. The following is the substance of that of M. Hurtado, a Spanish physician, who has lately published an Essay on Intermittent and Remittent Fevers.*

* Annales Cliniques de Montpellier, tom. xxxix. p. 323.

The best cinchona is that of Loxa, a brown species, the bark of the cinchona *condaminea* of Humboldt and Bonpland. "It is distinguished, chemically, by its infusion decomposing tartar emetic, animal gelatin, gall-nuts, and sulphate of iron, independently of some other characters which are not found in the same degree in the other known species, and which are confirmed by the proportions and colours of the precipitates obtained." The best bark of this description is procured in the woods of Utizinga, Enatizinga, and Caxanuma. The second is the Kalysaya, or orange cinchona, the bark of the cinchona *lancifolia* of Mutis, the yellow bark of commerce; and when collected, dried, and preserved with care, is as valuable a febrifuge as the former kind. "It however," says Hurtado, "sometimes attacks the head, and occasions gripings;" but it produces excellent effects when mixed with the former species. The third kind is the cinchona commonly called huanuco, the bark of the C. *oblongifolia* of Mutis, the red bark of the shops. The Spanish physicians have very little esteem for this bark.

M. Hurtado assents with the opinion of the majority of authors, that cinchona is most efficacious when administered in the form of fine powder; and next to that he recommends an infusion obtained by the simple maceration of the bark in warm water.

M. Laubert has extracted from cinchona bark, by means of sulphuric ether, a greenish substance, which possesses many of the characteristics of bird-lime, and an essential oil of a very peculiar nature. In the superior kinds of cinchona this oil has the aroma of benzoin; in the common kinds, the colour is less agreeable, and the oily substance appears more allied to the resins than the volatile oils.

Extract from a letter on the best mode of softening Adhesive Straps.

[From the Edinburgh Medical and Surgical Journal, for July, 1815.]

THE custom of carrying up chafing-dishes with cinders in them, still in use in some hospitals, is highly objectionable, both on account of the offensive nature of the vapour to the patients, and of their answering their purpose imperfectly. All that is necessary, and what is used in most English hospitals, is a large tinned case, from a foot to a foot and a half in diameter, filled with hot water. The back of the strap is applied around the circumference of the case, and is retained there till the plaster be as much softened as you wish. The greatest advantage of this method of warming the plaster is, that it produces an equable heat, and at the same instant of time; of great consequence, particularly after amputations.

DISPENSARIES.

Two more Dispensaries have been established; one in the Northern Liberties and the other in the District of Southwark. They are formed on the same plan as the Philadelphia Dispensary. The increase and extension of population have made these additional institutions necessary, in order to afford suitable medical relief to the indigent part of the community.

UNIVERSITY OF PENNSYLVANIA.

THE Trustees have, in addition to those already established in the Seminary, instituted a Faculty denominated "*The Faculty of Natural Science*," to consist for the present, of the following Professorships:

1. A Professorship of Botany and Horticulture.
2. A Professorship of Natural History, including Geology, Zoology, and Comparative Anatomy.

3. A Professorship of Mineralogy and Chemistry, as applied to Agriculture and the Arts.
4. A Professor of Natural Philosophy.

UNIVERSITY OF PENNSYLVANIA.

THE Medical Lectures will commence on the first Monday in November.

On Anatomy, by	Dr. Wistar.
Surgery,	Dr. Physick.
Practice of Medicine, &c.	Dr. Chapman.
Materia Medica,	Dr. Dorsey.
Chemistry,	Dr. Coxe.
Midwifery,	Dr. James.

CHEMICAL LECTURES.

JUDGE COOPER proposes to commence a Course of Chemical Lectures early in November. Due notice of time and place will be given.

LECTURES ON NATURAL HISTORY.

DR. CALDWELL will deliver, during the ensuing winter, a Course of Lectures on Natural History, Systematic and Philosophical, in which the several applications of the science to practical purposes will be particularly illustrated and enforced.

LECTURES ON NATURAL PHILOSOPHY,

BY DR. R. M. PATTERSON, M. D. Vice Provost, Professor of Natural Philosophy and Mathematics in the Collegiate Department, and Professor of Natural Philosophy in the Medical Department of the University of Pennsylvania.

Dr. Patterson intends to deliver a Course of Experimental Lectures on Natural Philosophy, during the ensuing winter, at the University, in Ninth-street. The Introductory Lecture

will be given on Monday, the eleventh of November, at seven o'clock in the evening; and the Lectures will continue on Monday and Thursday Evenings, at the same hour, until the beginning of March.

WINTER LECTURES ON BOTANY.

Dr. Barton's Winter Course of Lectures on Botany and indigenous Vegetable Materia Medica, will commence the first week in November, and terminate in the first week of February.

The Winter Course is intended for the benefit of those Students of the Medical Class, and other persons, who do not continue in Philadelphia, during the Summer Lectures.

Dr. Rush's Lectures, will commence on the first Monday in November.

RECENT BRITISH PUBLICATIONS.

Medicine.

An Analysis of the Mineral Waters of Tunbridge Wells, with some account of their Medicinal Properties; by Charles Scudamore, M. D. 8vo.

* Essays on Insanity, Hypochondriasis, and other Nervous Affections; by John Reid, M. D. 8vo.

Medical and Surgical Remarks; by Edward Granger, 8vo.

Reflections on Fever; by J. Calvert.

Natural History.

* An Introduction to Entomology, or Elements of the Natural History of Insects; by the Reverend William Kirby, R.A.F.L.S. and William Spence, Esq. F.L.S. illustrated by coloured plates.

Transactions of the Horticultural Society of London, part 4, vol. 2.

* A System of Physiological Botany; by the Rev. P. Ruth, F.L.S. with plates, 2 vols. 8vo.

General Zoology, or Systematic Natural History; commenced by the late George Shaw, M.D. F.R.S. &c. with Plates, from the first authorities and most select specimens, engraved principally by Mrs. Griffiths, vol. 9. 8vo.

PROPOSED BRITISH PUBLICATIONS.

Dr. Marcet announces an Essay on the Chemical History and Medical Treatment of Urinary Calculi; with Plates.

Practical Remarks in Surgery, illustrated by cases; by A. Copland Hutchison, M. D.

Observations and Inquiries into the Nature of the Yellow or Bulam Fever, in Jamaica and at Cadiz, particularly in regard to its Primary Cause and Contagious Powers; by Mr. Doughty.

* These Works have been received by Mr. Dobson of this city.

RECENT AMERICAN PUBLICATIONS.

By Thomas Dobson,

A Synopsis of the various kinds of Difficult Parturition, with Practical Remarks on the Management of Labour; by Samuel Merriman, M. D. &c.; with Notes and Additions, by Thomas C. James, M. D. Professor of Midwifery in the University of Pennsylvania.

First Lines of the Practice of Physic. By William Cullen, M. D. late Professor in the University of Edinburgh—with Notes and Selections from Currie, Hamilton, Fordyce, Hunter, E. Home, Saunders, Baillie, and other celebrated writers —in two volumes, handsomely printed, and bound in one very large volume. Price three dollars.

A Treatise on Surgical Diseases, by the celebrated Baron Boyer, translated by Alexander H. Stevens, M. D. Professor of Surgery in the Medical Institution of New-York—two vols. with Plates. Price six dolls. in boards.

Medical Sketches of the Campaigns of 1812, 13 and 14— To which are added, Surgical Cases; Observations on Military Hospitals and Flying Hospitals. Also, an Appendix on Dysentery and Peripneumonia Notha. By James Mann, M. D. A. A. S. Hospital Surgeon of the Army, &c. &c. Price in boards, two dollars and fifty cents.

PROPOSED AMERICAN PUBLICATIONS.

Thomas Dobson, has in Press, and will publish in a few days,

Medical Histories and Reflections. By John Ferriar, M. D. Physician to the Manchester Infirmary, and Lunatic Hospital. Four volumes in one.

By Anthony Finley,

Engravings of the Bones, illustrating the Anatomy of the Human Body; by John Bell, Surgeon, quarto, containing 15 plates. Also, a *second edition* of Charles Bell's Engravings of the Arteries, royal 8vo. 12 coloured plates.

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